

COMPTON'S

PICTURED ENCYCLOPEDIA

AND

FACT-INDEX

INTERESTING • ACCURATE • UP-TO-DATE



To inspire ambition, to stimulate the imagination, to provide the inquiring mind with accurate information told in an interesting style, and thus lead into broader fields of knowledge—such is the purpose of this work

VOLUME 7

F. E. COMPTON & COMPANY • CHICAGO

1944 EDITION
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1922, 1923, 1924, 1925,
1926, 1927, 1928, 1929,
1930, 1931, 1932, 1933,
1934, 1935, 1936, 1937,
1938, 1939, 1940, 1941,
1942, 1943, 1944

Here and There in This Volume

AT ODD TIMES when you are just looking for "something interesting to read," without any special plan in mind, this list will help you. With this as a guide, you may visit far-away countries and watch people at their work and play, meet famous persons of ancient and modern times, review history's most brilliant incidents, explore the marvels of nature and science, play games—in short, find whatever suits your fancy of the moment. This list is not intended to serve as a table of contents, an index, or a study-guide. For these purposes consult the Fact-Index and the Reference-Outlines.

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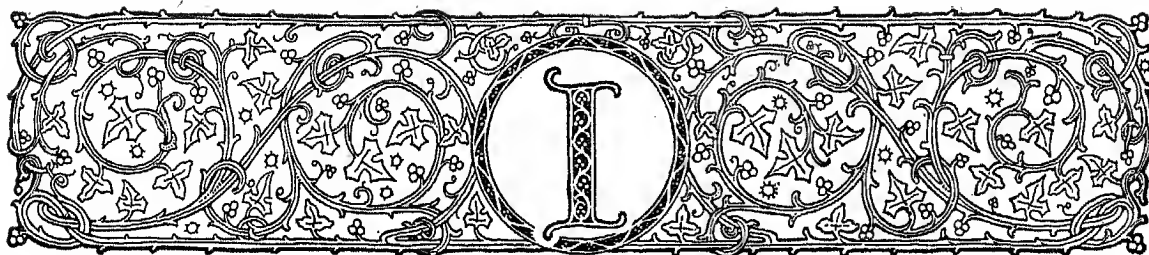
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Key to Pronunciation

Pronunciations have been indicated in the body of this work only for words which present special difficulties. For the pronunciation of other words, consult the Fact-Index. Marked letters are sounded as in the following words: *cāpe, āt, fār, fāst, what, fall; mē, yēt, fērn, thēre; īce, bīt; rōw, wōn, fōr, nōt, dō; cūre, būt, rūde, full, būrn; ū* = French *u*, German *ü*; *gem, gō; thīn, then; ñ* = French nasal (*Jean*); *zh* = French *j* (*z* in *azure*); *κ* = German guttural *ch*.



IBAÑEZ (ē-bā'nyāth), VICENTE BLASCO (1867-1928).

Spain was kept neutral by German intrigue throughout the World War of 1914-18, but from that land came the novel which contained the most bitter and scathing indictment of German war policy, and some of the most realistic pictures of battle scenes and war devastation. Translated into English it became one of the "best sellers" of the United States. Its title, 'The Four Horsemen of the Apocalypse', refers to the four riders of the Book of Revelations to whom in the dread day of the opening of the seals was given power "over the fourth part of the earth, to kill with sword, and with hunger, and with death." Its chief characters are a wealthy family of Spanish-Americans from Argentina who came to Europe and are drawn into the horrors of war.

Blasco Ibañez, author of this work, was the son of a merchant of Valencia. He studied law at the University of Valencia, but never took up its practise. He was violently opposed to the monarchy in Spain and later to the dictatorship of General Primo de Rivera. He had served a prison term before he was 18. Although he was elected eight times as deputy for Valencia, he was finally exiled and spent many years of his life abroad. He once said: "Dead or alive, I will never return to Spain as long as the present régime subsists. If I were to go home alive I should be arrested and persecuted, and if taken there dead I should receive honors which I do not desire." In his will he forbade his burial in Spain so long as the monarchy existed. When he died at Mentone, France, he was buried there, and it was not until 1933, after the overthrow of the Spanish monarchy, that his

body was removed to his birthplace, Valencia, Spain.

Neither great nor profound, Ibañez had a sweeping and colorful style, but lacked taste and humor. He was large, spectacular, and timely in his themes, and riotous in imagination. Therefore his books succeeded amazingly in the motion pictures, making him rich and world-famous. "Your life is your

greatest work," tactfully said Anatole France to Ibañez, admiring his political honesty.

Among the other works of Blasco Ibañez are 'The Cabin', 'Blood and Sand', 'The Shadow of the Cathedral', 'Sonnica', 'The Torrent', 'Mare Nostrum', 'The Enemies of Women', 'The Temptress', 'The Pope of the Sea', 'The Mob', and a violent political pamphlet, 'Alfonso XIII Unmasked'.

IBEX (ī'bēks). The home of the wild goat called the ibex is among the most precipitous and inaccessible heights of the Alps, Pyrenees, Caucasus, and Himalaya mountains. It lives habitually above the line of perpetual snow, only descending to graze at night.

The splendid horns of the male, 30 to 60 inches long, rise from the crest of the skull in a long graceful backward sweep, and are marked on the front with bold cross

ridges. The fore legs are shorter than the hind legs, making it easier for the animal to go up a slope than down. The hair is reddish-gray, growing longer in winter.

Ibexes feed in small herds, but the older males usually live alone and at higher levels than the females and the young. The Alpine ibex is now rare and is protected by law. In Asia hunting the ibex is a favorite sport.

Scientific name of the Alpine ibex or steinbok, *Capra ibex*; of the Nubian or Arabian ibex, *Capra sinaitica*; and of the Himalayan ibex, *Capra sibirica*.

WHAT A SPLENDID PAIR OF HORNS!



This is an Ibex on a high rock of the Himalayas. We may know that this is not an Alpine goat, for look what a long beard he has! The beard of an Alpine ibex is so short you can hardly notice it. The horns of the Asiatic ibex are much longer, too.

IBSEN, HENRIK (1828-1906). This great Norwegian poet and dramatist is remembered as a stern, lonely figure who found more evil than good in the world. This outlook doubtless sprang in part from hardships and disappointments in his own life.

Born in a poor family at Skien in southern Norway, he was apprenticed to an apothecary at Grimstad while still a boy. Seven years of drudgery followed. At the age of 19 he began to write poetry, and at 22 he had written a tragedy in blank verse. He entered the University of Christiania; but he did not have money enough to complete his studies. Thereafter he did poorly paid newspaper work, managed a small theater, traveled in Denmark and Germany to study scenic art, and wrote lyrics and unsuccessful plays.

Finally He Wins Success

Ibsen was long in discovering his true bent, and he waited still longer for recognition. His 'Vikings at Helgeland', which marked an epoch in Norwegian literature, and 'Love's Comedy', the first of his social satires, were coldly received. In bitterness of spirit he left Norway. Two years later, in 1866, he flung back from Rome his splendid poetic drama 'Brand', and aroused his native country to tardy acknowledgment of his genius. The Norwegian parliament granted him a pension and asked him to come home, but until 1892 he chose to live abroad.

Success won, he devoted himself to writing satiric comedies of modern social life. Misfortune had developed in him a biting irony; and his plays were so bold, pessimistic, and scornful of social hypocrisy that they could not be ignored. When he was denounced as "immoral," his reply was the epigram he put in the mouth of one of his characters: "A minority may be right, a majority is always wrong."

Fame Spreads to Foreign Lands

His recognition was greater abroad than in his native land. Some thought of him as a moral teacher, like Tolstoy, but this Ibsen denied. He was simply a commentator, he said, prescribing no remedies for social evils. In time it was recognized that his chief claim to distinction was as a playwright. His plots are masterly, his dramatic sense unerring, his dialogue lifelike. He scorned the "happy ending," and restored to the sentimentalized drama of the age something of

Greek simplicity and logic. He wrote in all more than two dozen dramas and dramatic poems. His plays have been translated into all European languages, and presented by gifted actors of many lands. It is not too much to say that he revolutionized the drama of Europe and America (see Drama).

Ibsen's best-known works are 'Brand' (1866); 'Peer Gynt' (1867); 'The Pillars of Society' (1877); 'A Doll's House' (1879); 'Ghosts' (1881); 'An Enemy of the People' (1882); 'The Wild Duck' (1884); 'Rosmersholm' (1886); 'The Lady from the Sea' (1888); and 'The Master Builder' (1892).

ICE. When water becomes cold enough, bits of it freeze into six-sided, needle-like crystals called *frazil*. These increase and interlace until they form solid ice in which the closely packed crystals can no longer be seen as separate bodies.

Because water expands as it freezes, ice is lighter than water and rises to the surface (a cubic foot of ice weighs 56 pounds; a cubic foot of fresh water about 62 pounds). On ponds, rivers, and lakes it tends to prevent the water below from freezing, and there fish and other water creatures can keep alive during the winter.

Occasionally at the bottom of ponds or rivers, stones or other objects become enough colder than the surrounding water so that ice forms upon them in spongy masses called *sponge ice* or *anchor ice*.

When water vapor in the air freezes it usually forms the light fluffy crystals we call snow (see Snow). At high altitudes it may turn into microscopic particles of solid ice which make up the cirrus type of cloud (see Clouds). Hail is simply snow crystals partly melted and frozen again (see Hail).

Like all crystals those of snow and ice have difficulty in forming without some tiny solid particle for a nucleus, such as a grain of dust. Hence in absolutely clean air, water vapor may be chilled below the freezing point, but it cannot freeze. This condition is called *supercooled*. An airplane remaining too long in supercooled air may accumulate so much ice that it will be forced down. Similarly, upon sufficiently cool objects such as trees, fences, and wires, water vapor which is almost ready to freeze will pile up in heavy masses called *glaze ice*. "Ice storms" of this sort can cause heavy damage to property. (See also Freezing; Water.)

WHEN *the* ICE CAME DOWN *from the* NORTH

ICE AGE. The people who may have been living in central North America 20,000 years ago saw ice and snow the year round. The men hunted along the edge of a great wall of ice that extended across the continent from ocean to ocean. In summer the women fished in chill streams that flowed from the melting ice. Anyone who ventured to climb the wall saw ice extending northward without a break.

These people were living in the grip of the latest Ice Age, a period when all of Canada, much of the United States, and most of northwestern Europe lay buried beneath sheets of ice hundreds or even thou-

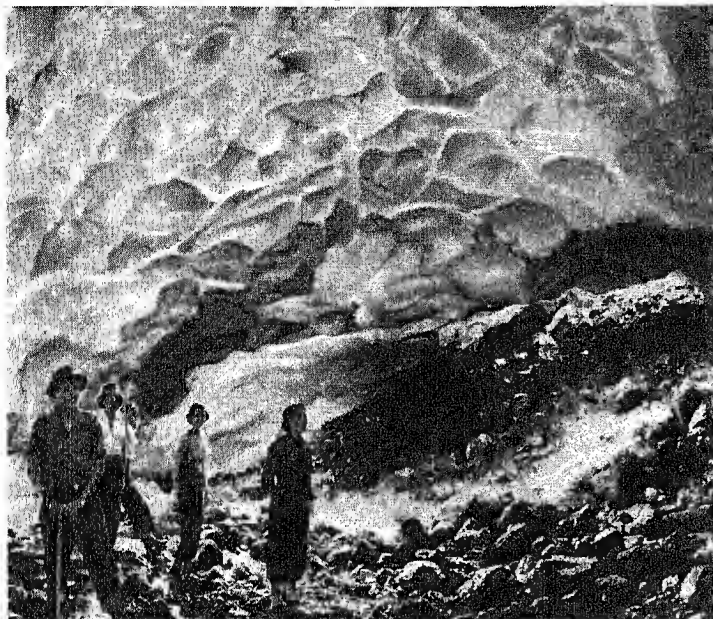
sands of feet thick. But these people did not live in bitter cold. The average temperature was only 10° or 12° F. lower than it is today along the border between the United States and Canada. Moreover, this cooler average and the very Ice Age itself were caused largely by cool summers rather than by bitter winters. There was not enough heat in the warm months to melt away the previous winter's snow and ice. So they piled up year after year, until they covered the northern country.

The biggest difference between the country near the edge of the ice sheet and the same country today

was in the vegetation and animal life. The cool summers prevented the growth of trees, grasses, and most flowering plants. The ground was covered with mosses and lichens, and in the warmest weeks a few low, fast-blooming plants sprang up such as we find in the Arctic today (see Arctic Regions). The principal ani-

mal was the reindeer or caribou, musk oxen, and mammoths, which could paw through snow to get food in winter; meat eaters such as bears and wolves; and waterfowl.

A REMNANT OF THE ICE AGE



This ice cave in a glacier high up on Mount Rainier, Washington, illustrates what happened at the wane of the Ice Age. The glacier, melting away about 70 feet a year, feeds a subglacial stream. Warm air entering above the stream hollows out a cave, and rocks embedded in the ice drop down in heaps.

mals were reindeer or caribou, musk oxen, and mammoths, which could paw through snow to get food in winter; meat eaters such as bears and wolves; and waterfowl.

The Ice Age Is Still with Us

Today, the geologists say, we are just reaching the end of this Ice Age. Inhabitants of Greenland still live at the edge of an ice wall, and explorers have traveled across that island, some 800 miles, on a solid sheet of ice. Echo soundings, made with seismometers, have proved that in places the ice is 8,000 feet thick (more than a mile and a half).

Ice-filled valleys are still fairly common in the higher mountain ranges of northern regions. These are called *valley glaciers* and cover small areas. The sheets of ice that cover great areas are called *continental glaciers* or, more simply, *ice caps* (see Glacier). By far the largest ice cap of the present day surrounds the South Pole. It reaches out beyond the land, and the edge floats upon the Antarctic Ocean (see Antarctic Continent).

Why Science Believes in an Ice Age

Why do scientists believe that ice once covered so much of North America? What proof have they that families of men lived near the walls of ice? The answers begin with Louis Agassiz, who was born in

1807 in Switzerland (see Agassiz, Jean Louis). Agassiz became a teacher of natural science, and he knew much about the glaciers of his native Alps. He observed how they rubbed the valley floors and sides, carried rocks, and left mounds of gravel as they melted. He noticed also that heavy boulders of granite could be found hundreds of miles nearer the sea than any deposits of this rock. Finally, bedrock far from the Alps showed grooves and scratches (called *striae*, from the Latin for "furrows"), such as would be made if glaciers had pushed smaller rocks over it. But if the glaciers had been big enough to do this, they must have covered most of northern Europe.

This belief became stronger when Agassiz found striae near the tops of mile-high mountains and strange boulders or *erratics* evidently of distant origin.

Other Traces of the Ice Age

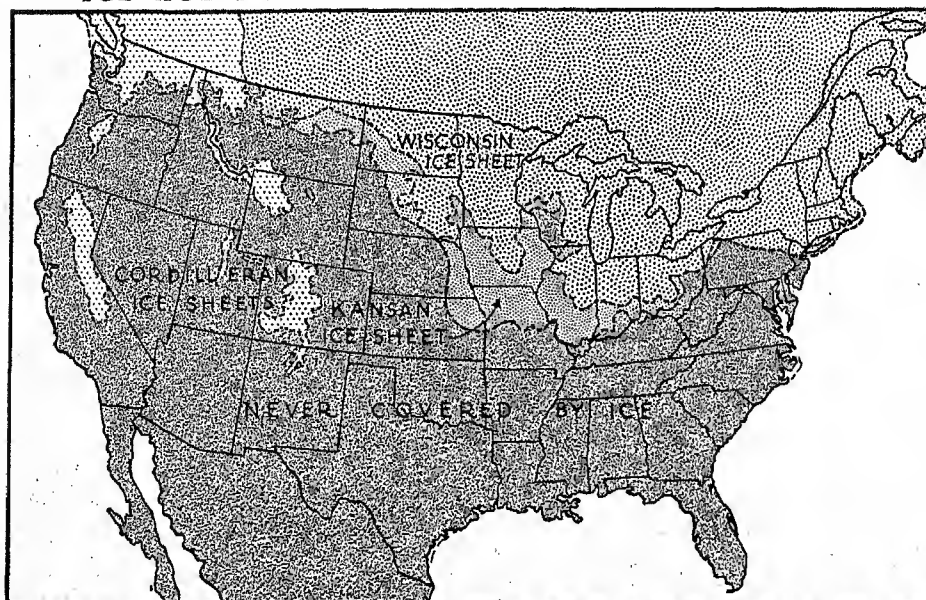
Geologists still use modern glaciers as a guide in studying the old Ice Age. These illustrate how the unmelted snow piled up and how the flakes changed to sand-like grains near the surface and to ice below. When the ice became about 150 feet thick, it began to push out at the edges. The creeping ice rubbed away small hills, and carried the gravel, sand, and clay that came from them into the valleys. These deposits are called *glacial till*. Streams of melt water flowing beneath the ice at the

edges of the glaciers scattered sand and gravel in long, crooked mounds called *eskers*. Drifts that piled up under the ice now appear as low hills called *drumlins*.

During this flow the ice carried boulders and soil southward until it reached a climate warm enough to melt it completely each summer. As it melted, it dropped its burden upon a sort of rubbish heap, called a *moraine*, along the line of melting. When warmer summers drove the line of melting northward, the moraines were left. Today we see them as broad, gently sloping mounds across the landscape.

Wherever the ice retreated, the water from the melting edge had to find new channels, for the old river valleys were filled with drift. Much of the flow was caught behind the moraines and the waters spread out to form lakes. As the levels of these lakes rose they overflowed at low places and often joined one another in long chains connected by small streams. A glance at any map of the northern United States and Canada will show this wealth of connected lakes and streams. The lakes range in size from small forest pools to the five Great Lakes (see Great Lakes). The famous "Finger Lakes" in New York State are striking examples of what happened when glacial drift blocked old river valleys.

ICE AGE BOUNDARIES IN THE UNITED STATES



The dotted and the light gray areas are those that were covered by thick ice sheets in the distant past. The Kansan sheet overlapped most of the area reached by the earlier Nebraskan sheet; and the latest, named the Wisconsin sheet, covered about the same territory as the Illinoian. In the high altitudes of the west we see the outposts of the Cordilleran ice sheet. Notice the "island" at the junction of the states of Wisconsin, Illinois, and Iowa that was never entirely covered by the ice.

As geologists studied this sort of evidence throughout the world, they decided that Agassiz's simple "Ice Age" really consisted of four periods; that is, the ice formed and advanced, then melted back toward the poles, four different times. They believe this because they find moraines and other deposits from each period, and in places these lie one over another, so that the younger can be distinguished from the older. In the United States, each of the four cold periods, called *glaciations*, is named for a state that was reached by its ice, as shown in the accompanying table. The intervening warm periods, called *interglacial* phases, are named for localities where relics from them were studied. In Europe, the glacial phases are named for the little Alpine river where they were studied and the interglacial periods are indicated by hyphenating the names of the glacial periods that preceded and followed.

	IN AMERICA	IN EUROPE
First Glaciation	Nebraskan	Günz
Warmer Period	Aftonian	Günz-Mindel
Second Glaciation	Kansan	Mindel
Warmer Period	Yarmouth	Mindel-Riss
Third Glaciation	Illinoian	Riss
Warmer Period	Sangamon	Riss-Würm
Fourth Glaciation	Wisconsin	Würm
Warmer Period	Modern or Post-glacial	Modern or Post-Würm

From the direction of the grooves or striae in the bedrock, it has been established that in North America the ice always spread out from the same three centers or ice caps. These were named after the regions they covered: Labrador, Keewatin, and Cor-

dillcran, as shown in the map on the next page. The thicknesses of the ice sheets in various places was measured by the height of the striae on mountain sides.

Many types of animals that formerly inhabited North America were driven out or destroyed by the successive invasions of ice. Among them were the huge elephant-like mastodon, the saber-toothed tiger, members of the camel and llama family, and several species of horses.

Patient study has helped geolo-

gists to estimate how long ago each of the four ice sheets covered North America and Europe. In general it seems that the Nebraskan ice sheet covered North America perhaps 2,000,000 years ago, the Kansan sheet 1,250,000 years ago, the Illinoian sheet 500,000 years ago, the Wisconsin sheet 100,000 years ago. The warm period called the *Yarmouth*, between the Kansan and the Illinoian glaciations, lasted much longer than any other period, warm or cold.

The latest, or Wisconsin, sheet probably began to melt at its edges about 40,000 years ago. The ice cap centered over Labrador drew back from the Niagara Falls region about 36,000 years ago and left New England clear about 28,000 years ago. The Keewatin ice cap, longer and thicker, did not leave Minnesota until about 15,000 years ago. Europe's ice blanket melted from central Germany 17,000 years ago, and from Sweden 13,000 years ago.

How the Ice Age Has Affected Modern Life

The immense amounts of glacial drift inherited from the Ice Age has influenced the character of soil wherever it was laid down and has played an important part in the development of agriculture (*see Soil*).

Other changes were caused by the tremendous weight of the ice sheet. It was about two miles thick over much of North America. This placed 400 tons or more upon every square foot of surface. The earth's crust sank under this load—from 300 to 800 feet in areas like New England. Here the land has not yet risen to its former level, and many ancient valleys are now under the sea, forming bays and inlets. Chile and Norway present other "drowned coasts," with many fiords filling valleys which old glaciers gouged out.

The estimated 12 million square miles of thick ice sheets were formed, of course, of water drawn from the oceans. This lowered the oceans several hundred feet below their present level, all around the world. Old, low shore lines have been found by sounding beneath the sea off the Hawaiian Islands, Bermuda, and elsewhere. A huge amount of water still remains locked in ice over Antarctica and Greenland. If this should melt, it would raise the oceans another 50 feet.

Scientists tell us that men moved southward and northward, as the ice sheets advanced and melted back. In Colorado and near by, flint arrowheads have been found embedded in the bones of mammoths and other Ice Age animals, now extinct. During the last cold period in Europe, men lived in caves where they left many relics (see Cave Dwellers).

Evidence of Earlier Ice Ages

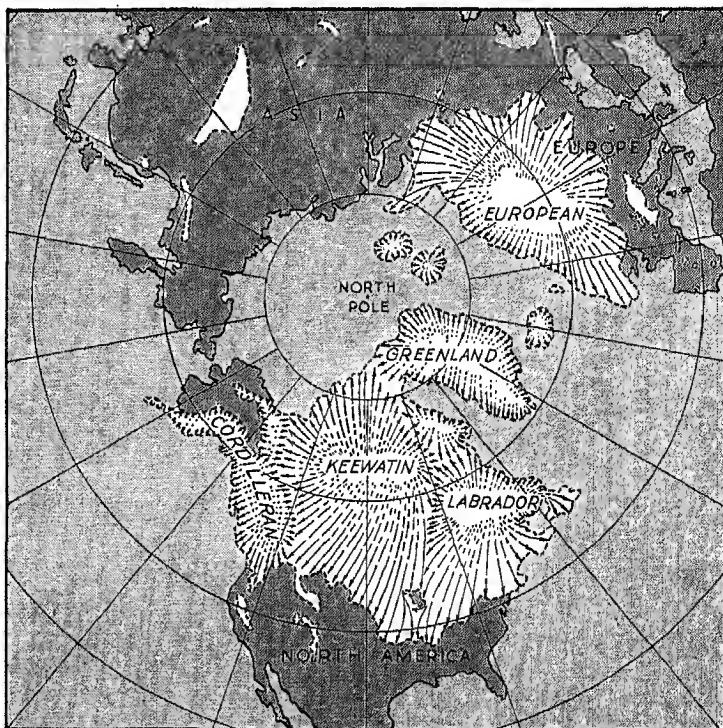
The latest Ice Age, with its four phases, is by no means the only one in the earth's long history, according to geologists. They believe that two Ice Ages occurred, one in eastern Canada, and another in China, South Africa, Norway, and North America, during Proterozoic times, when the earth was young (see Geology). During the Paleozoic era, the Coal Age with its luxurious swamp growth seems to have been closed by the most severe ice age the world has ever known. Even tropical lands in India and Africa show evidence of ice sheets. South America may have been ice-capped from the Brazilian jungles southward.

Causes Are Mysterious

Ice ages arrive, as we have seen, when the climate over a region becomes cooler, and summer heat fails to melt away winter ice and snow. But why should summers have become cooler at different times in the earth's history?

Some scientists have tried to explain this by variations in the movement of the earth around the sun. But no variation has ever been found which fits both the theories of astronomy and the record of what has happened on the earth. Others have guessed that blankets of dust or of carbon dioxide got into the air and

CENTERS FROM WHICH ICE SPREAD OUT



The map shows five great ice caps from which the ice moved outward during the Ice Age and to which it retreated later. Three of these are in North America.

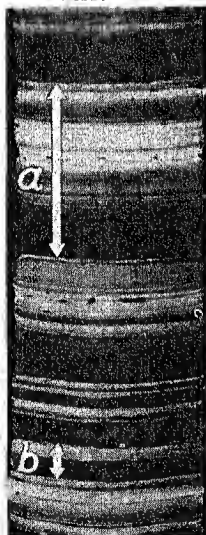
cut off part of the sun's heat. The newest theory was advanced in the early 1930's by a British meteorologist, Sir George C. Simpson. He suggested that the sun may have become cooler and warmer at various times, as some stars are known to do. But this theory only shifts the question from the earth to the sun. Why should the sun's heat have varied in this way?

"Calendars" in Clay

A most important help in studying ice ages rests on a discovery made by Baron Gerard de Geer of Sweden, when he learned how to estimate time from soil deposits on the bottoms of old glacier-fed lakes. These deposits were left by the outflow of water from the melting ice, and they differed with the seasons. Coarser sand settled in the summer when there was much melting and strong currents. This sand in turn was covered by thinner layers of fine clay deposited in winter from the quiet, ice-covered waters. De Geer called each combination of summer and winter deposits a *varve*—Swedish for "layer." Thus each varve represented one year of sediment.

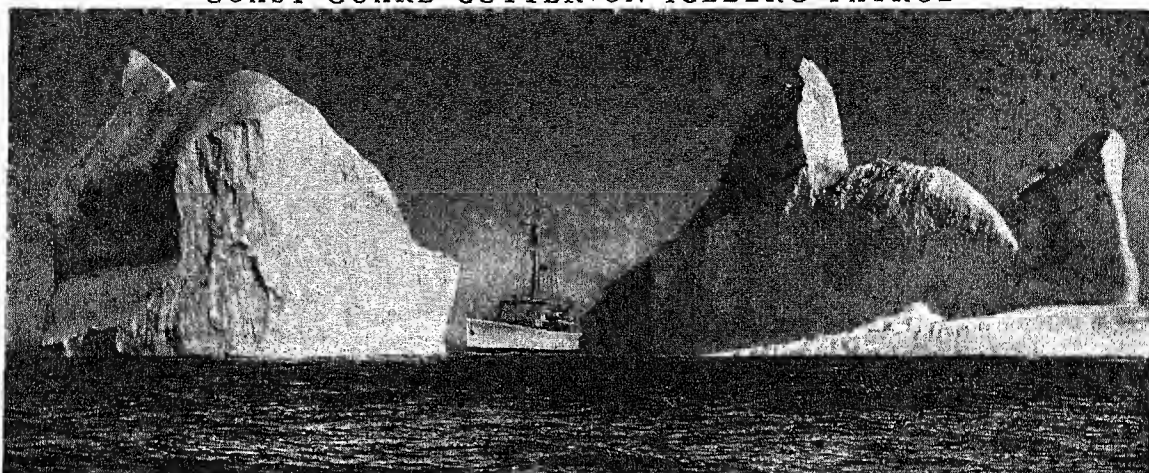
Varves differed from year to year, being thick in moist years and thin in drier ones. Wet and dry years tend to run in groups, and the varves in all the lakes of a region show a corresponding pattern. This made possible a year-by-year count of time from lake bed to lake bed as the ice cap melted back. As more southerly lakes dried up, distinctive "year-to-year" patterns would be left near the top of the deposit. Farther north, these patterns would be found near the bottom of a new lake. There the count of the years could be carried forward and could then move north again from lake to lake until the whole retreat of the ice was dated. Baron de Geer and his pupils made reasonably complete counts in Europe, and one pupil, Ernst Antevs, made a similar count in North America, from Long Island Sound to Hudson Bay. These counts helped to give dates for the latest Ice Age.

VARVES



Sample obtained by pushing a tube into the bottom of what was once a glacial lake in New Jersey. Compare thickness of varves a and b.

COAST GUARD CUTTER ON ICEBERG PATROL



From its gigantic bulk beneath the water, this iceberg thrusts two jagged peaks above the surface. In a short while, it will probably split down the middle. The patrol boat will then warn ships that there are two bergs to watch for instead of one.

ICEBERGS. Icebergs are at once the dread of sailors and the wonder of all who see them for the first time. They are the broken-off ends of glaciers that slide into the sea. They vary in size from small flat "growlers" to mountains of ice a mile or more across and rising more than 200 feet above the water.

The part below water is about seven times as large as the part above. This is because the iceberg is made of fresh-water ice weighing about seven-eighths as much as sea water. In fresh water the iceberg would sink down until about nine-tenths was below the surface (see Ice). The underwater part of an iceberg may extend far to one side of the visible part, so a ship that sails close may strike it. This happened to the steamship *Titanic*, which went down near Newfoundland April 14, 1912, with a loss of nearly 1,600 lives.

When these wanderers of the sea are free from the fog that so often surrounds them, they shimmer in the sun with dazzling beauty. Tints of delicate green mingle with blazing sapphire veins, and, at dawn and sunset, with glints of purple and azure and rose. As they drift along, many of them assume fantastic shapes—like castles, triumphal arches, or domed mosques. At night the bergs glow with a peculiar whiteness called "ice blink," caused by the reflection from the crystal surface of feeble light rays.

New icebergs are being formed constantly. Most of these in the north Atlantic break off from the continually advancing fringes of Greenland's great ice cap. Here in the early spring thaws great processions of floating ice islands begin their journey southward. Sometime in April, May, or June they reach the northern Atlantic steamer routes.

When afloat, icebergs melt rapidly in the salt water. As they dissolve they may split in two, roll over, or slough off great fragments with a gigantic roar. Some bergs, however, are so huge that they travel 2,000 miles or more before disappearing.

Two routes are particularly dangerous to ships during the iceberg season: one through the Strait of

Belleisle into the Gulf of St. Lawrence; the other by way of the Grand Banks. Since 1912 vessels of the United States Coast Guard have patrolled these danger zones, broadcasting reports by radio of the positions and movements of all icebergs encountered. The Hydrographic Office also issues regular bulletins charting the iceberg region, and laying down safe courses for ships. Often the presence of birds far from land means that floating ice is near. Ordinary measurements of air or water temperature are not reliable tests of the nearness of a berg, but sensitive instruments registering variations of 1/10,000 of a degree are used successfully. (See also Glacier.)

ICE CREAM. The people of the United States eat about three and a half million quarts of ice cream a day. To supply this vast amount, modern ice cream plants have elaborate equipment which does the work automatically.

Cream, milk, milk concentrates, and sweetening are the chief ingredients of ice cream. A small amount of some colloid, or "stabilizer," such as gelatin, prevents the formation of ice crystals. To these are added flavoring and coloring matter.

The principal ingredients are first mixed and pasteurized. The mixture is homogenized to break up the butterfat and then goes to the freezers. As the mix is frozen, air is whipped into it to make it light and creamy. This nearly doubles its volume, and the increase is called the "over run." Fruits or nuts may be added during or after freezing. When half frozen, the mixture is put into containers and hardened.

Ice cream contains the vitamins and minerals of milk. The grade or quality is regulated by law and depends upon the amounts of butterfat, of other food solids, of stabilizer, and of over run.

The origin of ice cream is not known. But credit for first freezing fruit waters is usually given to an Italian named Procopio Cultelli, who kept a café in Paris in 1660. By 1780 both ices and ice creams could be purchased in Europe and in the United States. In 1851 Jacob Fussell, of Baltimore, first manufactured ice cream on a large scale.

ICELAND—*The Oldest Living* DEMOCRACY

ICELAND. The story of Iceland is a bright chapter in the history of civilization. This remote island in the North Atlantic is the oldest living democracy. In the year 930, Icelanders created a parliament, the oldest of all existing parliaments. Within the next century they took a step which other nations did not take until centuries later: they established mutual insurance against loss of property. They had trial by jury long before England. In no country is the general level of education higher or is there a more widespread love of good literature. Crime is all but unknown, and Iceland's coöperative societies and liberal social insurance laws are models.

You marvel at the achievements of this handful of people—only about 120,000 of them—when you first see their bleak “island of ice and fire.” It thrusts up from the sea about 180 air miles east of Greenland and 500 miles northwest of Scotland. Its tip lies on the Arctic Circle. It is about the size of Kentucky, but only a quarter of its 40,000 square miles is fit to live in. The many fiords give it good harbors and a long coast line (3,700 miles).

The valleys of the fiords and the narrow coastal plains in the west and south are almost the only places where man can live. Mountains rim it all around, like a jagged crown. The high central plateau is a

wind-swept desert of sand and lava, ridged by mountains and strewn with glaciers and snowfields that never melt. An eighth of all Iceland is buried under snow and ice, and more than half is mountainous. Some of the snow-crested peaks rise to more than 6,000 feet. Short, swift rivers form many waterfalls. Many

farmers use the streams to generate their own electricity.

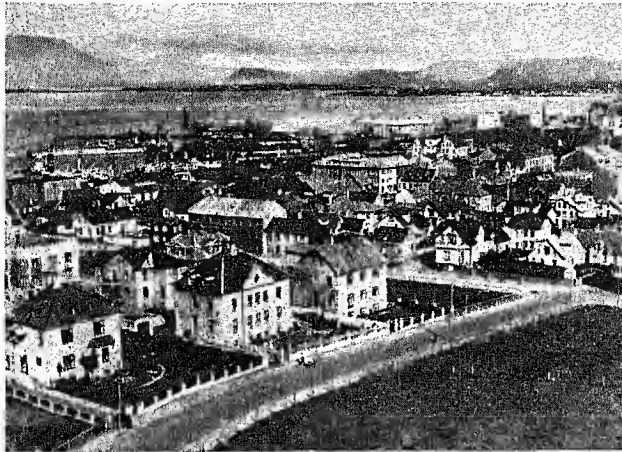
More than a hundred volcanoes, some still active, make Iceland one of the most volcanic regions of the world. Eruptions are rare but sometimes devastating. When Mount Laki broke out in 1783, it ruined so much pasture land that most of the live stock perished, and about a fifth of the people died in the famine that followed.

The volcanic rocks heat countless hot springs and geysers.

The largest is the famous Geysir (from *geysa*, Icelandic word meaning “to rush forth furiously”), from which the world's geysers take their name (see Geyser). The warm waters are piped to heat buildings and hot-houses, in which vegetables and flowers grow the year round. In some places water is piped through the soil to warm it for growing green crops.

In minerals Iceland is poor. It has no iron, and its only fuels are peat and lignite. Its deposits of Iceland spar, a kind of crystal used in optical instruments, seem exhausted (see Light). Virtually all

THE WORLD'S MOST NORTHERLY CAPITAL



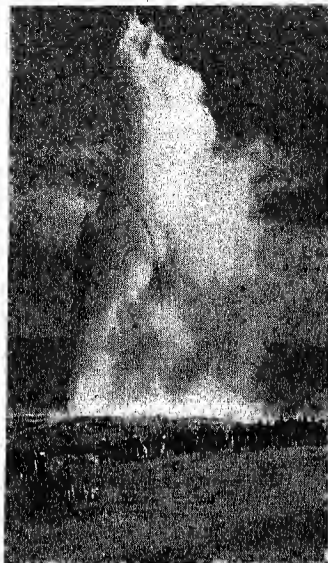
Neat, progressive Reykjavik huddles on a marshy plain at the foot of snow-capped mountains. These modern homes are built of concrete, since Iceland lacks timber. Many are heated by water from hot springs.

CURING CODFISH FOR EXPORT TO DISTANT MARKETS



Millions of codfish are piled here for drying. Canvas covers protect them from the frequent rains. Piling and sorting are done mostly by women, like these smiling girls in oilskins at a fishing port near Reykjavik. The codfish season is the first half of the year.

NATURE CROWNS A BLEAK LAND WITH SPECTACULAR BEAUTY



building materials have to be imported, except stone, and sand and gravel for concrete.

Though it is just below the Arctic Circle, Iceland has a moist, oceanic climate, for it lies in the outer edge of the Gulf Stream. Summers are cold, but winters are mild. At Reykjavik, the largest city, in the southwest, the July temperature averages 48 F., about the same as at Nome, Alaska, which is in the same latitude. But the January temperature is 32°, against 3° at Nome. The south has a heavy precipitation, about 53 inches a year and the mountains receive much more.

This is not a climate for easy living. There are many days of fog, rain, snow, and wintry gales. Plant life is sparse and stunted. Even though summer brings long hours of daylight, the temperature remains too low and the season is too short for good growth. Birches, the most common trees, rarely grow taller than a man, partly because of the terrific winter gales. Willows reach only ten feet or so. Harsh as the climate is, the changeable weather and the moderate annual temperature bring it close to the type considered best for human activity (see Climate).

A Nation of Farmers and Fishers

About a third of the people live on farms, though only about half of one per cent of the total area is cultivated. On a typical farm of some 640 acres only about ten acres can be worked. Most grains will not ripen in the short cool summers, and turnips and potatoes are almost the only crops aside from hay.

The Geysir (left) hurls a column of water 200 feet high. Skogafoss (right) is one of many waterfalls, potential sources of hydroelectric power. Lovely light effects, like the rays arching above the typical treeless hill (center), are common. Dairy cattle are increasingly important. Icelandic sheep (below) are small and long-wooled.

Grass grows well in the thin soil, and so Icelanders have made grass the backbone of their farming. They raise cattle and small, hardy sheep and horses. Imported automobiles, trucks, and farm machinery are appearing, but the sturdy Iceland ponies are still the farmer's mainstay for travel and work.

On many farms are nesting grounds for the eider duck, which furnishes down for feather beds. Eider down is also a valuable export. Some farmers raise foxes for furs.

The old cheerless houses of turf and stone are being replaced by dwellings of imported timber with iron roofs; the newest are concrete. The living room is still called "bath-stofa," recalling the days when a bathing basin was sunk in the earth floor. Milk is served at most meals, and a favorite dish is *skyr*, curdled milk with cream and sugar. Most of the farm products are consumed at home, but some mutton, salted or frozen, and some cheese are exported.

With so poor a soil, Icelanders could hardly live if it were not for the generous sea. The fisheries provide a living for nearly one-third of the people and furnish about four-fifths of the exports. In proportion to population the annual catch is enormous—about two tons for each inhabitant in some years. Icelandic waters are also fished by other nations, especially the Bretons of France, and usually produce about a fifth of the total European catch. Refrigerated trawlers carry some fresh cod and herring to European markets, but most of the catch is cured for export.

STURDY DESCENDANTS OF LIBERTY-LOVING NORTHMEN AND CELTS



A few factories make herring meal and oil and refine cod liver oil.

More than half the people live in towns or villages. Nearly a third (37,000) live in Reykjavik (from *reykur*, "smoke," hence "smoking harbor"), the chief port and capital. Its harbor is ice-free the year round. Except for the absence of trees, Reykjavik looks much like any small town in the United States. It has small manufactures of clothing, food-stuffs, and equipment for the fishing fleet—nearly all from imported materials. In the north the chief port is Akureyri. The few other towns range from only about 3,500 inhabitants to fewer than 1,000.

In this land of mountains and long winters, transportation is a major problem. There is no railway, but year-round airplane service and coastal shipping connect the chief towns. A motorbus highway links Reykjavik and Akureyri, but most of the roads are unpaved and unfit for winter use. Nearly every farm has a telephone. The government radio station at Reykjavik is an important source of weather reports for Europe and for North Atlantic shipping.

Aside from a considerable admixture of Celtic blood from the early settlers, the people are pure Scandinavian. Nearly all are natives, since immigration has always been discouraged. Late in the 19th century many Icelanders emigrated to Canada and the United States. Virtually all the people belong to the established church, the Lutheran.

Like other Scandinavians, Icelanders are reserved, but kindly and hospitable. Most of them have given



Most Icelanders plainly show their Norwegian origin, like the blond boy (below) and the tall girls (left), whose attractive national costume is now seen rarely. Others, like the countrywoman (right), show the strong admixture of Irish blood. The man and woman (center) are laundering at a hot spring. The boy's "ponies" are full-grown Iceland horses. Their thick coats and shaggy manes protect them from the cold.

up the old national dress for modern clothes. The young people are fond of athletics and sports. They wrestle, skate, ski, play rugby, swim in hot-spring pools, and dance the modern dances. Many have taken up gliding, with homemade gliders.

A Book-Loving People

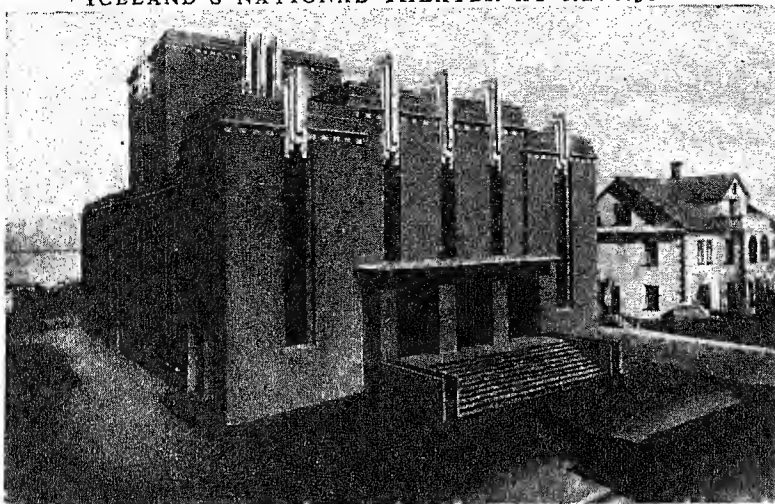
Iceland reads more books than any other nation, in proportion to population. Education is compulsory for children from 7 to 14; and there are several technical schools. At Reykjavik is

the University of Iceland (1911), a co-educational institution with schools of medicine, law, theology, and philosophy, and a famous library.

The Icelandic language closely resembles Norwegian. It has made two great contributions to the literature of the world. First is the *saga* (the Icelandic word for "story"). The Icelandic sagas are stories of ancient heroes, combining fact with legend. Second is the preservation of Scandinavian mythology and traditions (see Scandinavia). It was Iceland's poets and historians who first put these into written form. One of the honored names in world literature is that of Snorri Sturluson (1178-1241), who wrote the Prose Edda (or Younger Edda), a collection of myths and a manual of instruction for poets.

Why did the people of this lonely land achieve so high a level of culture? Part of the answer is that in the isolation of the long winter darkness they whiled away the hours by composing poetry and telling stories. Beginning in the 10th century, professional bards (*skalds*, "poets") traveled from farm to farm. And when this custom died out, nearly every home

ICELAND'S NATIONAL THEATER AT REYKJAVIK



Many of Reykjavik's new buildings, such as this theater, have the strong, simple lines of modern architecture. They harmonize with the flat, barren landscape. But homes are usually of a modified Danish style, like that at the side of the theater.

held "evening wakes," to hear some member of the family recite or read aloud. Even on remote farms parents early taught the children to read and write.

More than a Thousand Years of History

When Vikings first visited Iceland, about the year 850, it was already the home of a small Irish colony. But the history of Iceland as a nation begins in 874, when Norse colonists, preferring exile to the tyranny of King Harald the Fair-Haired, reached the island. As they neared land, their chieftain Ingolf Arnarson threw the sacred columns of his wooden high-seat into the sea and vowed to settle permanently wherever they drifted ashore. Three years later he found them where Reykjavik now stands. These colonists were joined by other chiefs and their households. Some of these had fled first to Ireland and so brought some Celtic blood with them (see Northmen). A liberty-loving people, they met in neighborhood assemblies, *things*, to make local laws. In 930 they established a general assembly, the *Althing*, and about the year 1000 they adopted Christianity.

But in the 13th century Iceland lost its hard-won freedom. It fell under the rule first of Norway and then of Denmark. Until late in the 19th century the country was ridden by misfortune. Its trade was exploited by Danish monopoly; volcanic eruptions and earthquakes laid the land waste; plagues killed large numbers. But in 1874 the undaunted Icelanders obtained the beginnings of home rule. They soon reasserted their historic ability to work for the common good, establishing their first cooperative society in 1882, giving women the right to vote in local elections in the same year, and enacting an old-age pension law in 1890. In 1915 women obtained full suffrage. In 1918 Iceland regained sovereignty and again became an independent nation. The only remaining political link with Denmark was that it had the same king. It also obtained the right to sever the union completely after 1943.

A new era began during the second World War. Iceland's geographic position gave it immense strategic importance as a potential air and naval base. To prevent it from falling into the hands of Germany, British and United States forces occupied it with the consent of the government (see World War, Second). In 1941 the parliament (*Althing*) adopted constitutional amendments proclaiming the termination of the union with Denmark in 1943 and pro-

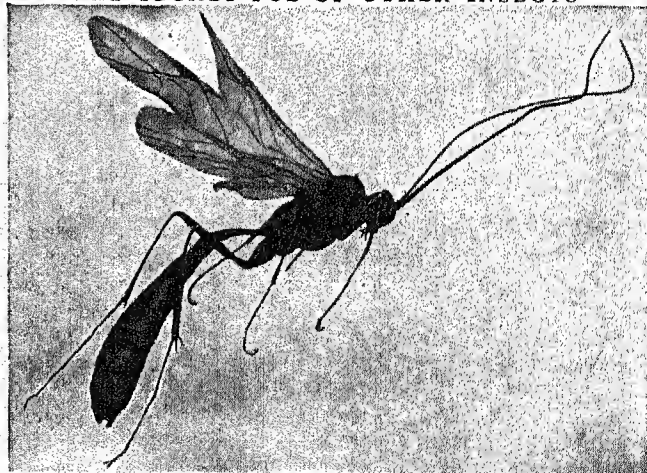
viding for the later establishment of a republican form of government. Administration meanwhile continued in the hands of a regent and a council of ministers headed by a premier. Members of the *Althing* are elected for four-year terms. This body is divided into a lower house and an upper house. The latter consists of one-third of the members elected by the entire *Althing*. **ICHNEUMON** (*ik-nū'mōn*). This is the common name for a number of weasel-like animals of North Africa, Asia, and southern Spain. The mongoose of India and the East Indies is a member of this group (see Mongoose). The Egyptian ichneumon (*Herpestes ichneumon*) is often called "Pharaoh's rat." It eats the eggs and young of reptiles and birds; when domesticated it will rid houses of rats and mice. The name is Greek; it means "tracker."

ICHNEUMON FLIES. These graceful four-winged insects are not flies, but are relatives of wasps and bees. They are of great value to farmers and tree growers. The females lay their eggs on or near the eggs and larvae of many different kinds of harmful insects. After the eggs hatch, the ichneumon larvae feed on the other larvae and kill them.

Ichneumon flies vary in size, but all have long slender abdomens with long legs which trail gracefully as the insect flies through the air. From the abdomen of the female extends a threadlike egg-laying organ called an "ovipositor" (egg depositor). In some species this organ reaches the amazing length of eight inches.

Scientific name, *Ichneumonidae*; order, *Hymenoptera*. More than 1,600 species have been described. One of the largest in America is the *Megarhyssa*, which measures 10 inches from the tip of the antenna to the tip of the ovipositor. The long ovipositor is used to reach wood-boring larvae.

THE SECRET FOE OF OTHER INSECTS



One of the ichneumon flies is this Yellow Ophiion. Its larvae destroy the caterpillars of the Polyphemus moth after they have made their cocoons.

The LAND of the COEUR D'ALENE and SHOSHONE



Mountain scenery like this earned Idaho its name, which means "Gem of the Mountains." Here you see the forests growing in evergreen masses, and above them the snowy crests that feed the clear flowing streams and the magnificent waterfalls. And somewhere back there in the mountains you are sure to find beautiful sparkling lakes.

IDAHO. Because of its wild and romantic beauty, the Indians gave the name "Idaho," meaning "Gem of the Mountains," or "Look, the sun is coming down the mountain," to the region now included in Idaho. The pioneer settlers called it "The Panhandle State" because of its shape. Idaho is one of the states carved out of the Oregon country, title to which was settled by treaty with England in 1846. Starting east of Washington with a boundary of only 45 miles on the Canadian border, it follows the Cabinet, Coeur d'Alene, and Bitterroot mountains, running southeast along Montana until it reaches a width of 308 miles between Oregon and Wyoming.

Scarcely anywhere in the United States are there mightier mountains, greener meadows, fatter farms, or a more generous store of fine and precious things than in Idaho. The face of the country is rough with mountains, spangled here and there with small bright mountain lakes, and many of its streams glide to the sea between the deep lips of long canyons—the poet's "waters between walls of shadowy granite, in a gleaming pass." Heavy forests grow in evergreen masses on the sides of the snow-crested ranges, and the clear streams flung down their sheer rocky sides make long white waterfalls that rival Niagara in grandeur. Shoshone Falls, where the Snake River plunges 190 feet into a dark-green lake at the bottom of a deep gorge, is exceeded in magnificence only by the falls of the Niagara and Yosemite. This incalculable supply of water power is one of the state's

Extent.—North to south, 483 miles; east to west, from 45 to 308 miles. Area, 83,557 square miles. Population (1940 census), 524,873.

Natural Features.—Coeur d'Alene, Bitterroot, Sawtooth, and Salmon River mountains (highest point, Borah Peak, 12,655 feet, in the Pahsimeroi Range). Principal rivers: Snake (Shoshone Falls, 190 feet), Salmon, and Clearwater; Lake Pend Oreille. Mean annual temperature, 45°; mean annual precipitation, 17".

Products.—Hay, wheat, potatoes, oats, barley, sugar beets; sheep, wool, cattle and dairy products, hogs; lumber products, butter, beet sugar, flour and mill products; silver, lead, zinc, gold, copper.

Cities.—Boise (capital, 26,130), Pocatello (18,133).

greatest assets and is being more and more used to turn wheels and to make electricity for the state. Water-power plants have been developed at American Falls, Minidoka Dam, Arrow-

rock Dam, Shoshone Falls, Swan Falls, Salmon Falls, the Thousand Springs, and Twin Falls.

On the slopes of the low round foothills are spread fields of wheat, oats, and alfalfa; and vegetables and fruits grow in the fertile valleys. Cattle graze in the tall grass of the upland valley meadows and on the wide plateaus. Geologists come from far away to study the lava beds of central and southern Idaho, which were poured down long ago from volcanoes now old and dead, and which the rain and frost and winds of millenniums have broken up into a soil of unusual fertility. And sick people come to the healing waters of the hot and mineral springs, which are so numerous that water piped from warm springs is used in winter to heat houses in Boise, the capital city. Other springs supply water almost ice cold all summer long. Currents of cold air from deep wells are used on many farms for refrigeration.

Mountainous Idaho, lying at so many different altitudes beneath the northern sun, necessarily has a widely varying climate. The southern and central sections are arid, with practically no rain in the summer, but with heavy snowfalls in winter. In the higher regions the winters are long and severe, but the lower valleys, sheltered by the Rockies and swept by winds from the Pacific, have mild winters. Even

A LAND OF WEALTH IN MOUNTAIN, FOREST, AND STREAM



AGRICULTURE

MANUFACTURING

TRADE &
TRANSPORTATIONOTHER
OCCUPATIONS

Notice, first, Idaho's peculiar shape which brought it the nickname of the "Panhandle State." Next see what a great number of rivers course through the valleys lying between the mountains that furrow nearly the entire state. Along the course of the great Snake River have been built some of the greatest irrigation projects in the country, adding to the wealth of Idaho's forests and mines the products of countless irrigated farms. Below the map the chief occupations of the people are compared.

some of the higher valleys are so sheltered that cattle can roam throughout the winter, and spring comes back to parts of Idaho long before it reaches some states lying in latitudes far more southerly.

A few rivers to the north flow off into the Columbia, but most of the state is drained by the long curves of the Snake River, winding in a tremendous canyon for 350 miles across the southern part of the state and for 200 miles along its western boundary. Much of this precious water supply, and also that of the crystal mountain lakes, is being developed for irrigation, particularly on the great intermountain plateau along the course of the Snake. Here are some of the largest irrigation systems in the country, with great dams and reservoirs and more than 10,000 miles of canals costing in the neighborhood of \$100,000,000. Thus what was once a frowning desert has been transformed into the best farming land of the state. Wheat, alfalfa, timothy, and oats grow here lux-

uriantly, as well as in the fertile northern valleys where no irrigation is needed; in the southeast especially fine macaroni wheat is raised by dry farming. Potatoes and sugar beets are important crops. The Boise, Weiser, and Payette valleys, and the district about Lewiston are famous for their orchards of apples, cherries, prunes, pears, apricots, and peaches. Livestock raising also is a leading industry. Idaho usually ranks close to the leaders in wool production.

Timberland covers almost half of the state. White and ponderosa pine, Douglas fir, larch, and other conifers make lumbering an important industry. Lewiston is the leading lumber center. Over a million acres of forested wilderness, known as the Primitive Area, have been set aside for recreational and conservation purposes in the central part of the state.

Minerals contribute much to the state's wealth. Lead, silver, zinc, copper, and gold are widely distributed; but the great mining region is in Shoshone County, in the north, where lead, silver, and

Aside from the products of the sawmills and planing mills, the beet-sugar factories, the flour and grist mills, and the dairies, the state has developed no important manufactures; though concrete making,

meat packing, and fruit drying and canning are growing industries.

Idaho was for a long time included in the vast unexplored Oregon country. At that time the Kootenay, Pend d' Oreille, Coeur d' Alene, and Nez Percé tribes of Indians lived north of the Salmon River, while the Shoshone or Snakes, the Sheepeaters, and the Bannocks lived south of this stream.

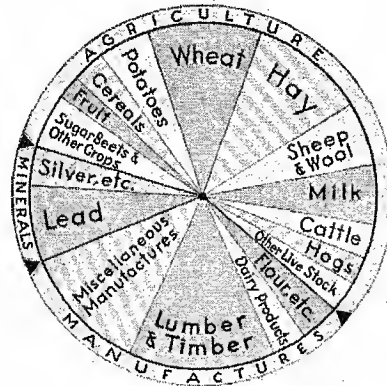
The first white men known to have explored the region were Meriwether Lewis and William Clark during their expedition to the mouth of the Columbia in 1805 and 1806. After crossing the

treacherous Rocky Mountain barrier through Lemhi Pass, they started down the Salmon River. Impassable rapids and falls made them turn back into Montana to seek a new trail. Going north, they crossed the Bitterroot Range through Lo Lo Pass, and fol-

lowed the famous Lo Lo Trail through Idaho to the junction of the Clearwater and Snake rivers. (See Lewis and Clark Expedition.)

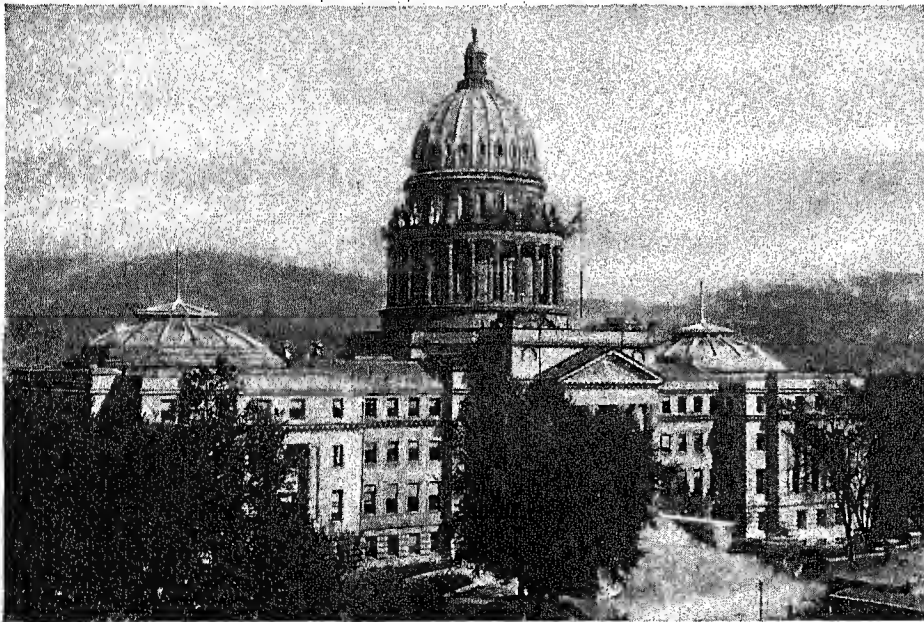
During the first decade of the 19th century, English and American fur traders established posts in Idaho. John Jacob Astor organized the Pacific Fur Company in 1809 and in the following year sent Wilson Price Hunt with an expedition into this region. Hunt's party crossed the Grand Teton Pass into Idaho, and started down the treacherous Snake River in canoes. "Caldron

Linn" and the "Devil's Scuttle Hole" are names given by Hunt to the rapids below the American Falls near Milner, where a member of his party was drowned. In 1824, the powerful Hudson's Bay Company entered the fur trade of this section. It built



Sources of Idaho's Wealth

THE STATE CAPITOL AT BOISE



Boise, the capital of Idaho, stands on the site of a former fur trading post of the Hudson's Bay Company. A United States military post was established here in 1863, and the next year the city was organized as the capital of the territory. The famous Arrowrock Dam 27 miles away provides electric power for the city as well as irrigation for the surrounding country. Boise's most interesting feature, the Capitol, is surrounded by trees which Presidents Harrison, Roosevelt, and Taft helped to plant.

zinc occur together in one of the world's richest mineral treasure-houses. There are also deposits of antimony, arsenic, cobalt, manganese, quicksilver, and tungsten. The semi-arid southeastern plateau contains a vast store of phosphate rock.

Fort Boise in 1834, and in 1836 purchased Fort Hall. Among the pioneer adventurers who entered Idaho, no one was more widely known and loved than Francis Payette, for whom a city and a river of the state were named. Capt. B. L. E. Bonneville spent the years 1832-35 in exploring the Idaho region. His travels were narrated by Washington Irving in 'The Adventures of Captain Bonneville'.

Following the trappers came the missionaries: Henry Spalding, who settled at Lapwai Creek, near the present city of Lewiston, in 1836; Marcus Whitman, who continued on into what is now the state of Washington; and Father Peter J. De Smet, a Jesuit, who labored among the Indians of the Northwest. A small group of Mormons moved into eastern Idaho in 1855, and in 1860 founded the town of Franklin, Idaho's first permanent settlement. Others came in such numbers that about 20 per cent of Idaho's population today is Mormon.

A rush of miners to Idaho followed the discovery of gold on Orofino Creek in 1860. More gold was found the next year at Pierce City and in the Salmon River district. The rough Indian trails were jammed with pack-trains headed for the new mining camps.

In 1863, a rich placer camp opened in the Boise Basin. By 1864 Idaho's population had increased to nearly 20,000. In 1863 Idaho became a territory. Montana and part of Wyoming were then within its boundaries. The creation of these two states later left Idaho with

its present irregular outline. Occasional Indian outbreaks harassed the early Idaho settlers, but by 1877 most of the Indians had been removed to reservations.

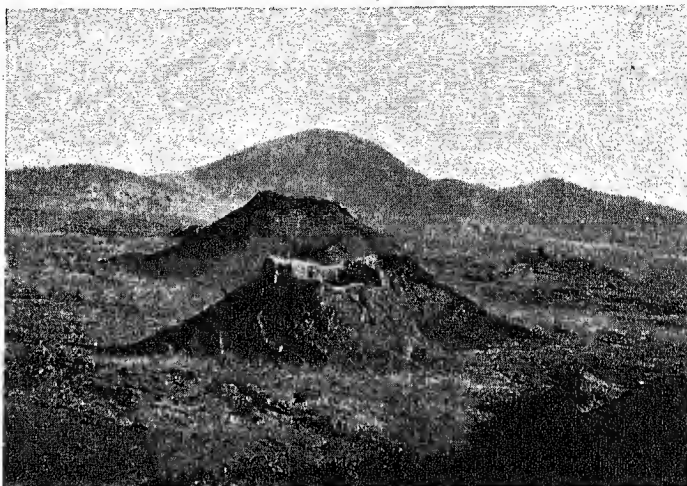
Idaho was admitted as a state in 1890. Although its rate of growth has been rapid—it doubled its population in every decade from 1870 to 1910—it is still only thinly settled. Twice the size of Ohio, it has less than one-tenth the population, and only about 10 per cent of

the state's area has been put under cultivation.

The lack of transportation between the settled northern and southern sections, due to mountain barriers, has been a great handicap. Four main railroads cross Idaho from east to west, but travel by rail from north to south still carries one through Oregon and Washington. The North and South Highway, however, now links the north and south boundaries.

Politically, Idaho has been distinguished for its progressiveness. It gave the franchise to women in

LIKE A LANDSCAPE ON THE MOON



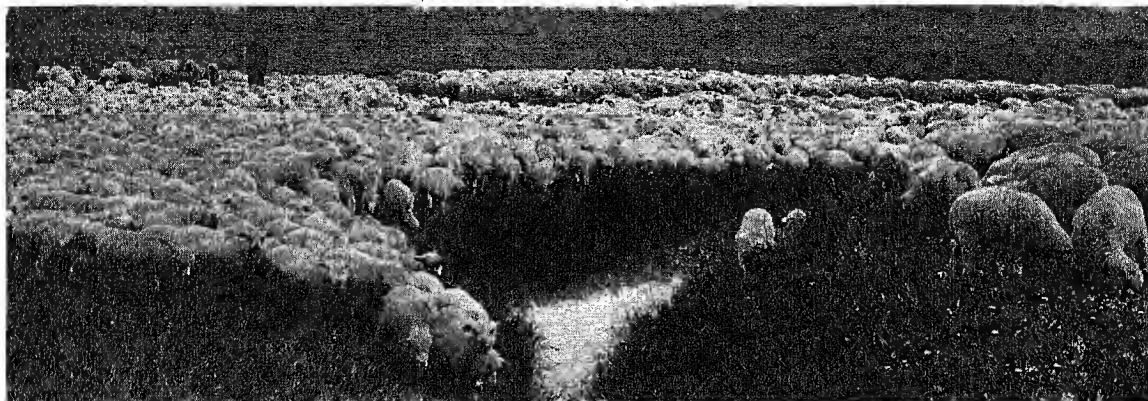
On the Snake River plateau in Idaho, lies a volcanic waste almost unexplored until recently. Desolate beds of lava, jagged with cinder cones, craters, and steam vents, give a weird resemblance to a lunar landscape. This region was set aside in 1924 as the Craters of the Moon National Monument.

ONE OF THE MANY BEAUTY SPOTS IN IDAHO



At the Shoshone Falls, the waters of the Snake River take a sudden plunge of nearly 200 feet. These falls for their impressive beauty have been compared to those of Niagara.

IDAHO WOOL "ON THE HOOF"



What a lot of nice woolen clothes and dresses and blankets and things are going about here on four legs, cropping close the grass of the Idaho plains! This is a snapshot of part of a flock of 37,000 sheep owned by one of the big ranching companies of Idaho. With its vast areas of fine grazing lands, Idaho ranks as one of the foremost sheep-raising states in the Union.

1896; introduced the initiative, referendum, and recall in 1912; and state-wide prohibition in 1916. The constitution, adopted in 1889, reserves all the waters of the state for public use. The executive department consists of a governor, lieutenant-governor, secretary of state, treasurer, and others, all elected for two-year terms.

Several serious mining strikes have disturbed the state, and in 1905 Gov. Frank Steunenberg, who had opposed the miners, was assassinated.

Schools and Colleges

The University of Idaho is at Moseow, on the Washington border in the north of the state. A southern branch is located at Pocatello. There are state normal schools at Albion and Lewiston. Gooding College and the state institute for the deaf and blind, are at Gooding; the College of Idaho is in Caldwell.

Boise, the capital, is on the Boise River, about 45 miles from the Oregon line in the southwest corner of Idaho. It is the financial and shipping center for southern Idaho and eastern Oregon. Its industries are built chiefly on the lumber, agriculture, and mining activities of the region. Pocatello is the second city. Railroad shops and later irrigation of the surrounding desert stimulated its growth.

IGUANA (*i-gwá'ná*). This fantastic family of lizards, great and small and varying widely in appearance, is found altogether in North and South America, except for two genera in Madagascar and one in the Fiji Islands. Their curious teeth, round at the root and sawlike at the tips, are the distinguishing characteristic. Typically, too, they have a large dewlap or pouch under the head and neck and scaly crest running down the back from the neck to the end of the long slender tail. Most of them are green and live among trees; some have the power of changing their colors apparently at will.

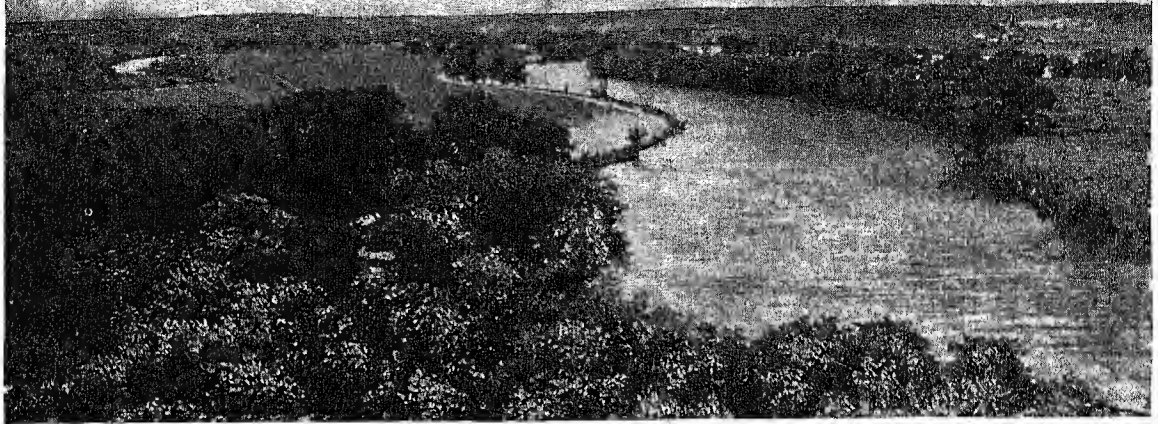
The great Galapagos sea iguana—four or five feet long or more—spends most of its life in the water. It has slightly webbed feet and feeds on seaweed. The Galapagos land iguana is a stout lazy creature, which feeds on the foliage of trees. The large common iguana of Central and South America—a green tree lizard—is hunted by the natives for its white delicate flesh which resembles chicken. The rhinoceros iguana of San Domingo has two horns on its nose. Even more frightful in aspect, though as harmless as other iguanas, is the helmeted or hooded basilisk of Central America, with its wicked-looking crest on head and back. (*See also* Lizards.)

IRRIGATION PRODUCTS



Here are three examples of the good things the soil of Idaho produces—much of it land that used to be classed in the old geographies as part of the "Great American Desert." It has been transformed by irrigation. Apples, wheat, and potatoes from Idaho are of exceedingly fine quality.

In the HEART of the UNION — the "PRAIRIE STATE"



ILLINOIS. From a happy hunting ground of the Indians to one of the busiest sections of North America is the story of scenic and historic Illinois. In less than three centuries French trading posts have become great cities, until the "Prairie State"

now ranks among the leading industrial regions of the world. Illinois stands near the middle of the continent, binding North to South and East to West. Its chief city, Chicago, is the metropolis of the Middle West and the second city in size in the country. Transportation lines from all directions center here, and give Illinois more miles of railway than any other state except Texas.

In addition to its advantages of position, the state is rich in natural resources. It has abundant supplies of coal and petroleum for its manufacturing and transportation industries. Virtually the entire state is covered with rich well-watered lands that make it second only to Iowa in corn production, first in soy beans, and near the head in wheat, oats, and hay. It has the biggest meat-packing center in the world, and it also produces swine, cattle, and sheep in great numbers. The most remarkable feature about Illinois is that while it ranks third or fourth in manufactures, and is among the first six states in minerals, it has also ranked very high in agricultural products. Until Iowa passed it in 1920, Illinois regularly led in value of farm lands.

With its gradually sloping hills and broad shallow valleys, Illinois is one of the most level states in the country. The only considerable eminences are about

Extent.—North to south, 385 miles; east to west, 218 miles. Area, 56,400 square miles. Population (1940 census), 7,897,241.

Natural Features.—Level or rolling prairies with an offshoot of the Ozark Ridge in the extreme south and low hills in the north. Principal rivers: Illinois, Rock, and Kaskaskia, tributaries of the Mississippi; Embarrass and Little Wabash, tributaries of the Wabash. Lake Michigan at northeastern corner. Mean annual temperature, 52°; mean annual precipitation, 37".

Products.—Corn, hay, wheat, oats, soy beans; hogs, cattle, dairy products, poultry, meat packing; iron and steel, agricultural implements, electrical machinery, petroleum products; coal, petroleum, natural gas, clay, cement, stone.

Cities.—Chicago (3,396,808), Peoria (105,087), Rockford (84,637), East St. Louis (75,609), Springfield (capital, 75,503), Cicero (64,712), Oak Park (village, 66,015), Evanston (65,389), Decatur (59,305); Berwyn, Aurora, Rock Island, Joliet, Quincy (over 40,000).

50 miles from the southern boundary, where a narrow branch of the Ozark Mountains crosses the state. In the northwest the state reaches its greatest height in hills that rise some 1,200 feet above sea level; but even these are only a few hundred feet above the

surrounding country. From north to south the surface of the land as a whole slopes gently to the lowest point, at Cairo, which is only 279 feet above sea level.

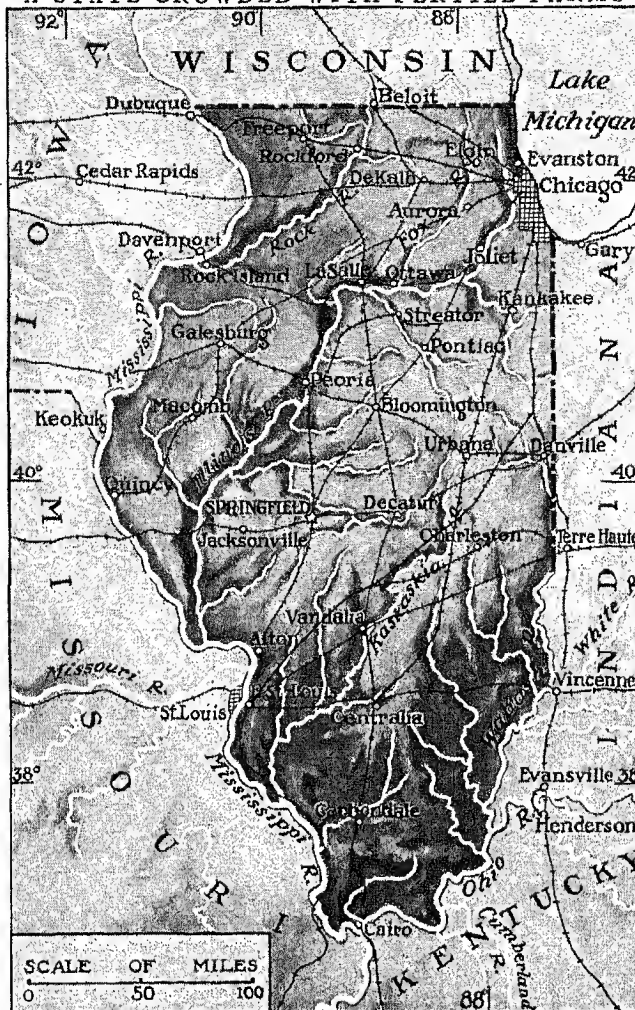
If a relief map of Illinois shows a land of no mountains, it shows one well covered with rivers. On the east the state touches the vast "unsalted seas" of the Great Lakes. On the west and south it borders for hundreds of miles on two of the greatest navigable rivers of the United States—the Mississippi and the Ohio; and on the east, separating it from Indiana, is the Wabash. Nor is the interior less well supplied. There are more than 275 streams in the state, grouped in two river systems. Three-fourths of the streams flow into the Mississippi, while the others are tributary to the Wabash or Ohio rivers. The most important river in the state is the Illinois, which, formed by the junction of the Des Plaines and Kankakee, drains almost half the state. The early French explorer, Father Marquette, wrote of it: "We have seen nothing like this river for the fertility of the land, its prairies, woods, and wild cattle. It has many little lakes and tributary rivers."

All along the Illinois and other rivers of the state are bluffs of considerable height and steepness, the most noted of which is Starved Rock, which rises from the Illinois River opposite Utica. The view of

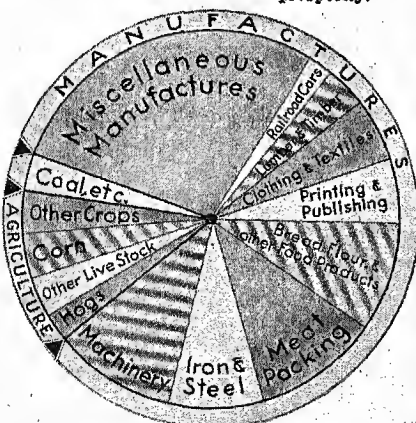
the countryside from the top of this mammoth rock, 157 feet above the river, and the numerous wooded ravines and canyons extending far up and down the river, is unrivaled in beauty anywhere. The spot is also rich in historic lore. Here the intrepid explorer La Salle built Fort St. Louis as a link in a chain of French fortifications; and here, in after years—if tradition is to be believed—perished the last remnant of the Illinois Indians, driven by their foes to the flat top of the rock, where all but a few died of hunger rather than surrender. The district about Starved Rock has been made a state park. Deer Park Canyon, a few miles away, is another place of great natural beauty and interest.

Other state parks are Fort Massac on the Ohio River, the gateway by which George Rogers Clark entered and conquered the British; and New Salem, the home of Abraham Lincoln, located on the Sangamon River not far north of Springfield. It was here that Lincoln kept store, studied law, and was elected to the legislature. The Rutledge Inn, where he boarded, and courted Ann Rutledge, has been restored, along with other historic buildings. So has Fort Chartres, standing in a state park near the Kaskaskia River,

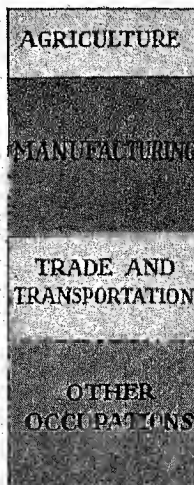
A STATE CROWDED WITH FERTILE FARMS



Illinois' position at the foot of Lake Michigan, with the Mississippi River for its western boundary, makes the state a natural avenue of commerce. This, added to the richness of its soil, explains its great prosperity.



The circular graph shows the relative value of Illinois products. At the right we see how the working population of the state is divided among the leading occupations.

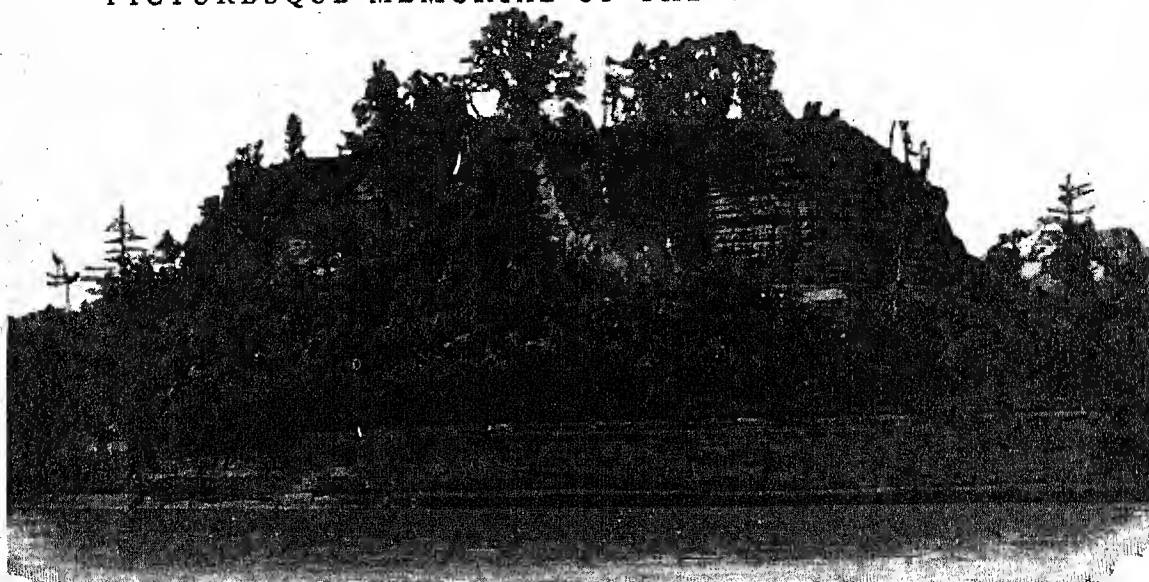


which was the center of French influence in the Middle West for more than a century. Cahokia Mound, or Monk's Mound, about six miles from East St. Louis, is one of the most imposing monuments of the prehistoric mound builders in the United States, and attracts many visitors annually.

When the early explorers penetrated Illinois the treeless plains resembled billowy seas of tall grass and beautiful flowers. Forests were found only in the southern part and bordering the rivers in the north. Today both forests and prairies have yielded to the plow, and there is nothing to suggest the name that Illinois still holds—the "Prairie State." More than 85 per cent of its land is under cultivation. One may travel for miles and see nothing but ample farms with comfortable farmhouses, and prosperous middle-sized communities.

These level and extremely fertile farming lands will always be a great, enduring source of the state's wealth. The plow may run for miles without touching a pebble or scarcely a grain of sand. The rich black loam is so fertile that in many places rotation of crops is not necessary. The gentle slopes and fine soil have invited the

PICTURESQUE MEMORIAL OF THE GRIM INDIAN WAR



This is the famous Starved Rock as seen from the Illinois River. From the top of this rock, which stands 157 feet above the river, the eye takes in a charming panorama of wooded ravines and canyons. Looking back into history, we remember that this is the rock on which La Salle built Fort St. Louis and on this level summit gathered the last remnant of the Illinois Indians, fleeing from the Potawatomes, and here they perished from hunger.

introduction of machinery making large farms possible and enormously increasing the production. In some places the flatness of the land has been a handicap, because of poor drainage. Tile drains and ditches remove this difficulty, and make these lands some of the most valuable in the "corn belt." Illinois leads the Union in its acreage of drained land.

Climate and soil permit also of the growing of nearly every crop known in the temperate belt. Even cotton and tobacco are grown to a small extent in "Little Egypt," around Cairo, where the state melts invisibly into Kentucky conditions. But by far the most valuable of Illinois' crops is corn, grown chiefly in the north and central parts of the state. For a number of years Illinois ranked first in corn production, but in recent years Iowa has held first place both in yield and value. Together Illinois and Iowa produce almost one-fourth of the corn raised in the

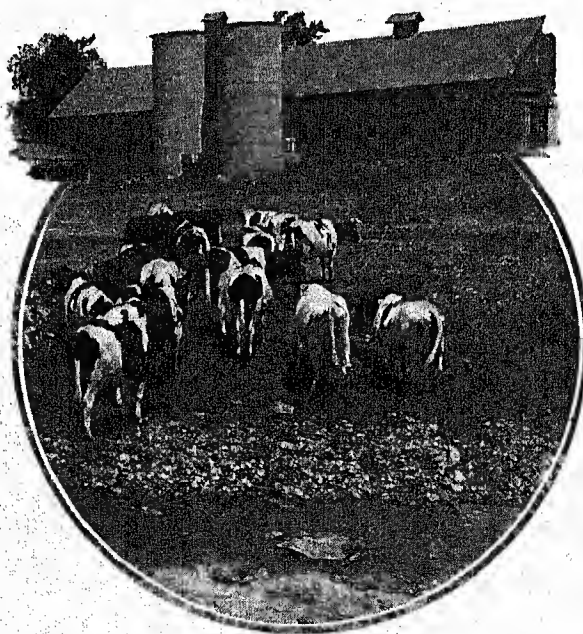
United States. Wheat is grown extensively in the southern part of the state, and hay and oats are abundant in the north, where dairying is consequently well developed.

Oats and hay encourage the breeding of horses, of which there are almost a million. Corn is used to feed hogs and cattle, and to make corn sugar and various other corn products. Garden produce is raised extensively near the large cities, and apples and strawberries are grown in every county.

Coal and iron, the most important minerals in the world, are both readily available to Illinois. Coal is furnished by its own enormous deposits, which underlie most of the state, and cheap water transportation places the rich Lake Superior iron-ore region within easy reach. Another important mineral is petroleum, in the central and

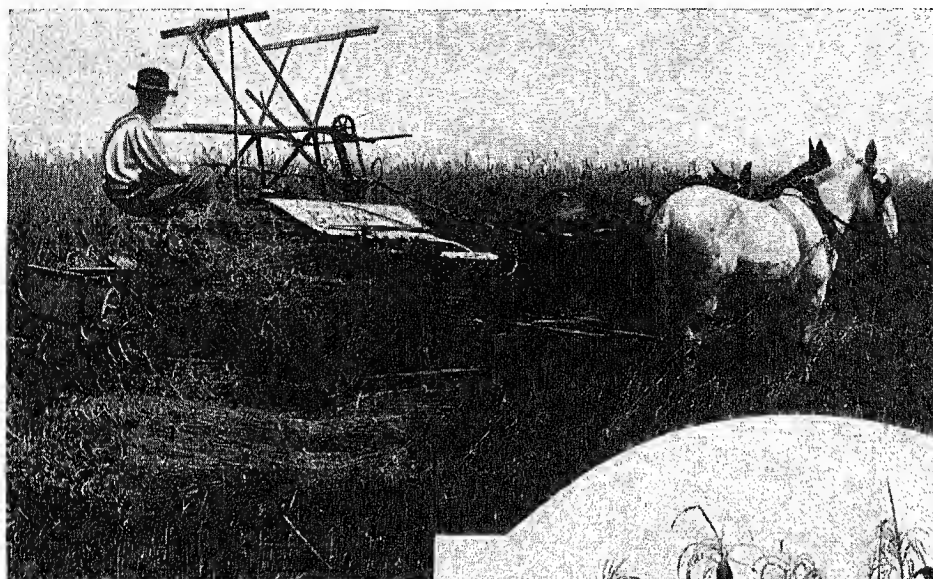
south central parts of the state. Some natural gas is produced. Clay for brick and tile is found in nearly every county. The abundant supply of limestone is

ON AN ILLINOIS STOCK FARM



This picture of a group of Holsteins taken near Quincy is typical of the fine stock farms of Illinois.

PRODUCTS OF ILLINOIS FARM LAND



Only one other State—Iowa—surpasses Illinois in the value of its farm lands. The upper picture shows a field of grain in the southern part of the state, and in the lower picture you see a group of giants of the corn field. Illinois and Iowa together produce about one-fourth of the corn raised in the United States.

extensively used in the manufacture of portland cement. Next to Kentucky Illinois produces more fluor-spar (used chiefly in smelting iron) than any other state. It also has some lead and zinc mines near Galena.

Manufactures and industry on an enormous scale are the result of the cheap and plentiful coal, combined with easily accessible iron. Cyrus McCormick established his harvester factory in Illinois, and today there is scarcely a place in the civilized world where you will not find agricultural implements made in Illinois. Meat-packing is the most important single industry. The stockyards and packing establishments of Chicago are, indeed, the greatest in the world; and about this industry and the grain trade, for which also Chicago is a world center, have grown a number of related industries dealing with the preparation and marketing of food products. Just to the south of Chicago, and in many other cities, are important steel mills. The state ranks high also in the manufacture of watches, furniture, musical instruments, soap, and men's clothing.

Because of the importance of agriculture, mining, and manufacturing in the state, Illinois is great in commerce. Its central location, its level surface, and the forced direction of east-and-west railroads around the southern end of Lake Michigan, account for the number of railroads in the state. Illinois also holds the best position among the states for inland water transportation. On Lake Michigan it has harbors at



Waukegan and in the Chicago and Calumet rivers. The Mississippi, Ohio, and Wabash rivers furnish more than 800 miles of navigable waters. Within the state the chief river is the Illinois, which is navigable for 245 miles from Grafton, where it flows into the Mississippi. The Illinois and Michigan Canal was opened in 1848 to afford water transportation from the Illinois River to Chicago, and for many years this canal was an important factor in the transportation of the state. It was superseded in 1933 by a new waterway. For 60 miles, from Utica to Lockport, this uses the Illinois and Des Plaines rivers, which were deepened by a series of dams and locks. This

HARPER MEMORIAL LIBRARY, UNIVERSITY OF CHICAGO

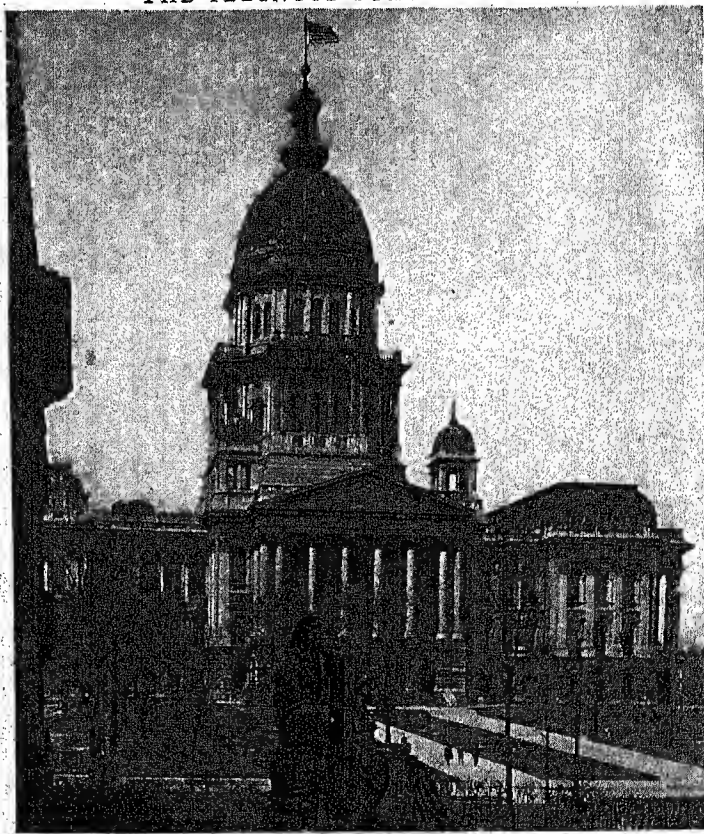


This is the Harper Memorial Library of the University of Chicago, named in honor of Dr. William Rainey Harper, the remarkable man to whose energy, vision, and organizing ability the success of this great institution of learning is largely due. Like the other buildings in the great quadrangle, it is in the Gothic style and of gray limestone. The nucleus of the Library, a collection of 173,000 volumes carefully selected, was purchased in Berlin soon after the University was organized.

portion is known as the Illinois Waterway. At Lockport this joins the Chicago Sanitary District (drainage) Canal, which was completed in 1900, primarily to carry away the sewage of Chicago and prevent pollution of Lake Michigan. The Illinois and Mississippi (Hennepin) Canal, 75 miles long, connects the Illinois and Mississippi rivers by way of the Rock River.

Almost half the population of Illinois lives in the region about Chicago, which is the center of a metropolitan area estimated to contain about 4,000,000 people. Chicago ranks as one of the great cities of the world, and is second only to New York in the United States both

THE ILLINOIS STATE CAPITOL

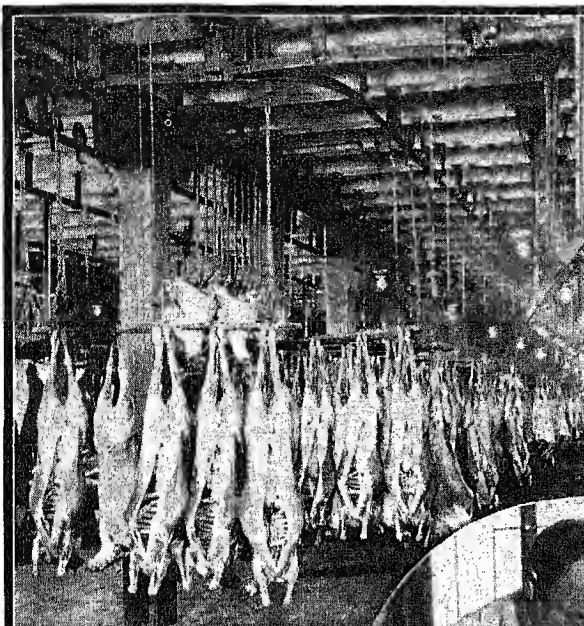


This is the building in which the laws of the State of Illinois are enacted—the imposing Capitol in Springfield. It is built in the form of a Greek cross with porticoes of granite. It was begun in 1868 and took twenty years for its completion at a total cost of over \$4,000,000. This is the fifth capitol building in the history of the state and the second built in Springfield.

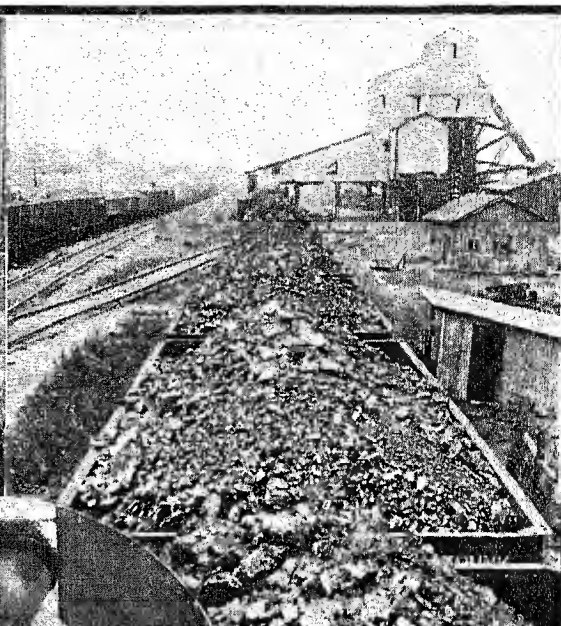
in population and in the value of its manufactures (see Chicago).

The second city in Illinois is Peoria, situated near the center of the state on an expansion of the Illinois River called Peoria Lake. Surrounded by a rich agricultural region, with excellent transportation by rail and water, Peoria has a great wholesale and retail trade; and its proximity to coal beds makes it the home of many and varied industries. Among its leading manufactures are corn products (syrup, starch, glucose), agricultural implements, and commercial alcohol and alcoholic liquors. It also trades extensively in fish, caught in the waters of the Illinois River.

SOME GREAT ILLINOIS INDUSTRIES



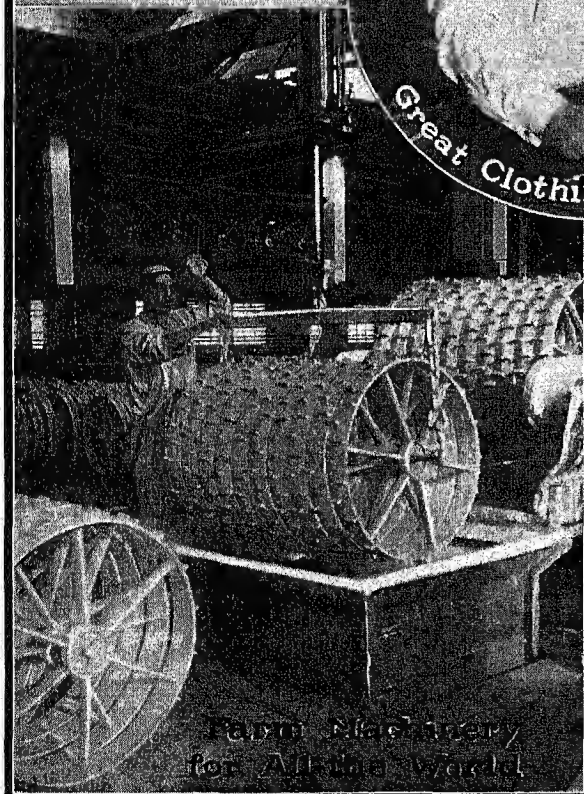
World's Greatest
Packing Center



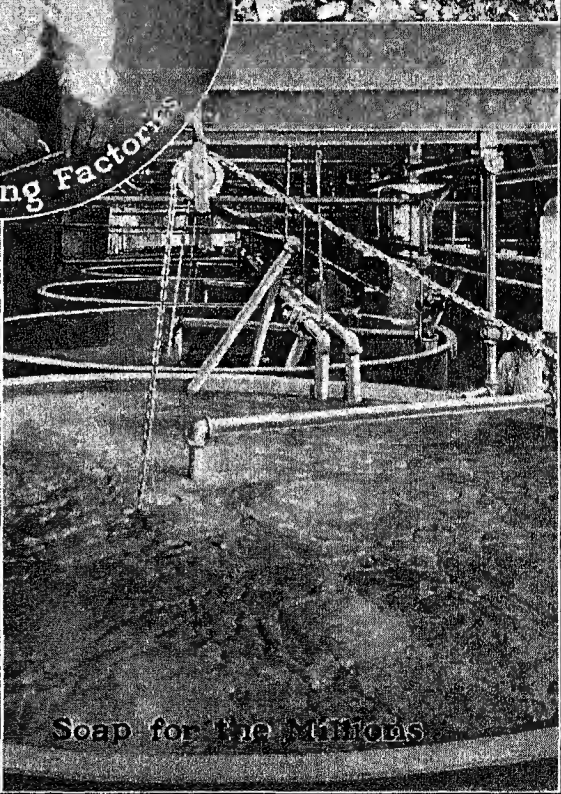
Enormous
Coal Deposits



Great Clothing Factories



Farm Machinery
for All the World



Soap for the Millions

These pictures show some of the industrial enterprises upon which rests the prosperity of Illinois. Add to these the products of the fertile farms and you have the combination which, with its central location and abundant means of transportation by land and water, makes that state one of the richest in the Union.

Springfield, the capital of Illinois, is a beautiful city laid out with wide and well-shaded streets, with the public square and court-house in the center. The state capitol is one of the finest public buildings in the West. Located in a rich agricultural district, it is an important railroad center from which large shipments of coal, grain, and live stock are sent out. Its chief manufactures are steel, flour, shoes, paving materials, agricultural and road equipment, and watches.

East St. Louis, situated on the Mississippi River opposite St. Louis, Mo., is connected with that city by great steel bridges. It is the western terminus of many eastern railroads. Its industries include meat packing, steel works, flour mills, aluminum works, and aircraft manufacturing. Other important cities are Rockford, one of the great furniture-making centers of the United States; Elgin, famous for the manufacture of watches and clocks; Joliet, which contains some of the largest steel plants in the country; and Decatur, Aurora, and Quincy, important manufacturing cities.

Illinois schools and colleges are justly famous, and the state stands near the top in the amount it spends on education. In addition to its splendid elementary schools, the state maintains a state university at Urbana, and five teachers colleges, at Normal, Carbondale, Charleston, DeKalb, and Macomb. The University of Chicago, founded by John D. Rockefeller (*see* Chicago); and Northwestern University, at Evanston, are among the largest and best known institutions of the country. There are about 30 other colleges and universities of recognized standing.

The Government of Illinois

Illinois has had three constitutions, adopted in 1818, 1848, and 1870. Owing to many restrictions upon the lawmaking power in the existing constitution, and the practical difficulties of amendment save by constitutional convention, ratified by popular vote, the present instrument often makes it difficult to achieve needed improvements, particularly in governmental methods, taxation, and court procedure.

The state is divided into 51 senatorial districts; each district elects one senator and three representatives. By the peculiar provision that the voter may vote for each of three candidates, give one and one-half votes to each of two, or three votes for one, a minority party may elect or defeat a representative.

In 1917 Illinois took a great step in administrative reform by organizing its more than 100 appointive commissions and officials under nine departments—finance, agriculture, labor, mines and minerals, trade and commerce, public health, registration and education, public works, and public welfare.

Because of the origin of the early settlers, Illinois has three county types. Seventeen southern counties are of the Virginia type, with a board of three commissioners. County-township government exists in the northern part of the state, with a board of supervisors from the townships according to population. Lastly, there is the case of Cook County, which has

15 commissioners, 10 from Chicago and 5 from the remainder of the county. There are also districts, like the Sanitary District, which have taxing power.

The History of Illinois

The first white men to see the Illinois prairies were Joliet and Marquette. They came up the Illinois River in 1673, and named the country after the "Illini" Indians. By 1750, some 2,000 French fur traders, settlers, missionaries, and soldiers, with a few negro slaves, were living in and near Kaskaskia, near the mouth of the river of that name, Cahokia, just south of the present city of East St. Louis, and other posts. (*See* Joliet; La Salle; Marquette.) Title to the region passed to Great Britain in 1763, after the French and Indian War.

During the Revolution, George Rogers Clark was sent by Governor Henry of Virginia to seize the Northwest. With his "Long Knives" (Kentucky frontiersmen), Clark captured Kaskaskia and Cahokia, and the Northwest became a county of Virginia. (*See* Clark, George Rogers.)

Territorial government was established in 1787 (*see* Northwest Territory), and two years later the region between the Ohio and the Illinois west of the Wabash became St. Clair County, with Cahokia as its capital. In 1800 Illinois became part of Indiana Territory. On Feb. 3, 1809, Congress set up Illinois and all the territory north to Canada as the Illinois Territory, with its capital at Kaskaskia, and Ninian Edwards as governor.

The opening of the lead mines at Galena in 1826 attracted hundreds of people. Until 1830 most of the migration into Illinois came from the south, and the settlements were almost all below the Illinois River. Then northern settlers started coming through Chicago.

In 1818 Nathaniel Pope, the delegate to Congress, petitioned to have Illinois admitted as a state. Overcoming strong opposition, he succeeded in having the northern boundary set at 42° 31' instead of at 41° 39'. By this change a 60-mile strip, including Chicago, became part of Illinois instead of Wisconsin, and the north end of the state, peopled largely from New England and New York, was able to out-vote the pro-slavery southern end, and to prevent the legalizing of slavery in 1834. Vandalia was the capital from 1820 until 1837, when Springfield took its place.

The rapid settlement of the northern part of the state provoked the Black Hawk War in 1832. In 1837 the state began ambitious improvements, halted by the panic of 1837; but the Illinois and Michigan Canal and a short railroad, the Northern Cross, were constructed.

From 1850 to 1876 Illinois was especially prominent in national affairs. Senator Stephen A. Douglas in 1850 secured a liberal land grant for the building of the Illinois Central Railroad. It was completed in 1856, and in the following year Chicago was linked by rail with the East. The Lincoln-Douglas debates in 1858 drew the attention of the whole country. (*see* Lincoln-Douglas Debates). Lincoln, who piloted the nation through the Civil War, and Grant, who won the military victory, were both Illinois men.

Gen. John A. Logan (1826-1886) served Illinois as both soldier and legislator, winning fame in the Civil War as a military leader. He took part in the siege of Vicksburg and was made military governor of that captured city, later being given command of the Army of the Tennessee. In 1866 he was elected to Congress, and in 1871 was named United States senator.

Increasing industrialism and a large foreign population have brought riots and strikes to Illinois, such as the anarchist Haymarket riot in 1885, the Pullman strike in 1894, and the coal mine strikes around Herrin in 1922.

In 1855 public schools were made free, and in 1889 attendance was made compulsory. The first child labor law was passed in 1891, and a 10-hour law for women in industry in 1909. Women were given the vote for school officials in 1891. Free state employment agencies were established in 1899, and workmen's compensation in 1911. The Australian ballot was introduced in 1891, and primary elections in 1910.

ILLUSIONS. For more than two thousand years the Parthenon at Athens has been man's ideal of architectural beauty. The eye delights especially in the

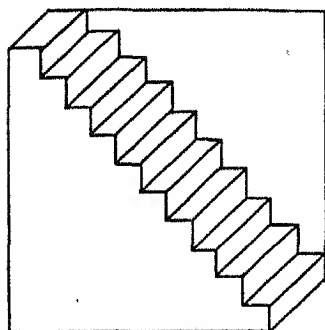


Fig. 1. Is this the top side or the under side of the cellar stairs? Watch it change.

simplicity of its apparently straight lines. Yet in reality the Parthenon contains no straight lines at all. Wisely, the architects made its columns taper toward the top not in a straight line, but with a slightly convex or bulging curve; and they also made its seemingly horizontal lines curve almost imperceptibly, according to a careful mathematical scheme. They knew that the eye deceives, that straight lines, viewed from certain angles, appear curved—so they

curved the lines in just the right manner to make them appear straight. They understood the principle of optical illusion.

All our senses are subject to this trick of illusion. Moving pictures, for example, are based on optical illusions. Objects in them do not move, but instead we see a series of pictures shown in such rapid succession that they seem to move. We see strange shapes in the fog and hear imaginary voices in the shrieking of the wind.

Various explanations of illusions have been offered. In general it may be said that in an illusion there is always some circumstance which throws off the normal process of perception and prevents accurate judgment.

Fig. 1 is a good example of an optical illusion. Does it represent the top side or the under side of a flight of stairs? As you look at it, it will change like magic from one to another. Actually it is only a grouping of straight lines. But in real stairs, as in most



Fig. 3. The two shapes are of identical size. The upper seems smaller.

objects, we see three dimensions, and so the mind immediately associates depth with these lines and likens them to the stairs with which we are familiar. The shift of "appearance" takes place in our minds.

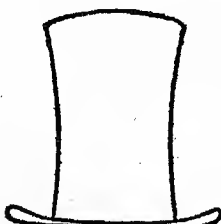


Fig. 4. This high hat is no taller than its brim is wide—believe it or not!

Perspective, which makes distant objects appear smaller than near ones, causes the puzzling illusion in Fig. 2. You may need to measure the figures to convince yourself that they are identical in height. Yet the picture of the man in the rear, who appears to be a giant, is really no taller than the picture of the little man who leads the procession. (See Perspective.)

You may make a game of Fig. 3, in which the lower diagram appears to be larger than the upper one. Cut two such identical shapes out of a folded sheet of paper, then slide them about, exchanging their positions. They will seem to change size before your eyes. The upper one seems smaller because the eye, instead of comparing its lower line with the lower line of the other drawing, compares it with the longer arc which is nearer.

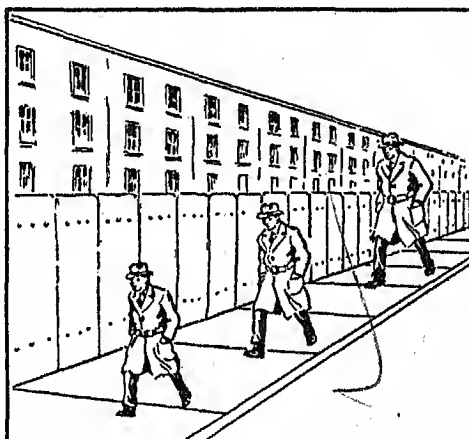


Fig. 2. These three men are of exactly the same height. But we are so used to allowing for perspective that the last man seems a giant.

Equally baffling is the drawing of a hat in Fig. 4. Though it appears so tall, it is really no taller than the width of its brim. Two factors enter into the illusion. First, our tendency to see vertical lines as longer than horizontal. Second, our tendency to see a broken or intercepted line as shorter than an unbroken one.

Fig. 5 illustrates our tendency to view objects as a whole rather than to isolate certain parts of them with the eye. Surely the two heavy diagonal lines bulge at the center of the drawing! But they are really perfectly straight and parallel.

The eye travels rapidly along a line, in ordinary perception. When this continuity is interrupted, the mind is confused. And so, as we look at Fig. 6, we find it hard to see the diagonal lines as parts of a straight line reaching from corner to corner of the figure.

Look at Fig. 7 on the next page. At first glance you will say that the white square below is larger than the one above; yet they are really exactly the same size. The wide black border

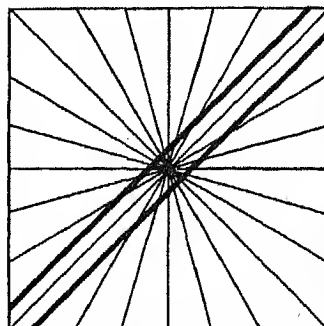


Fig. 5. Two parallel lines do not seem parallel when the eye is confused by the spider-web.

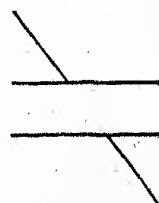


Fig. 6. Are the diagonals both in one straight line?

so dwarfs the central white space that we naturally, in the comparison, underestimate its true size.

Fig. 8 shows one form of the famous "arrow-head and feather" illusion. In A the horizontal line is divided exactly in the center, as you can see by comparing it with C; yet the right-hand portion seems much longer than the left-hand. Photographs of the eye movements of a person looking at this figure show that the converging lines at the left cause the eye to stop short of the true length of the horizontal line, while the diverging lines at the right cause the eye to move too far. The eye movements are shown by the dotted line in B.

Not all illusions are visual or optical. Construct a box of very thin wood 12 inches each way and another box $1\frac{1}{2}$ inches each way. Put into the smaller box enough metal to make it weigh exactly the same as the larger box. When you pick up the larger box it will seem much lighter. We are in the

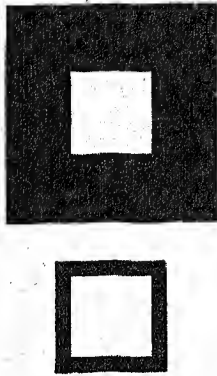


Fig. 7. The two white squares are identical in size, but the eye includes the border which dwarfs the upper white square.

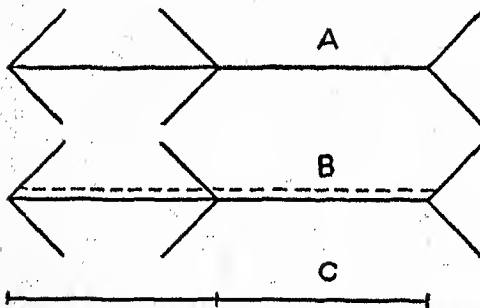


Fig. 8. The left half of the straight line in A is just as long as the right half, though it seems shorter, because the dotted line in B is the one followed by the eye. C shows the line unconfused by the "arrow-head and feather" illusive lines.

habit of interpreting size as weight because the larger of two like objects is nearly always the heavier.

Most famous of all illusions is the one in Fig. 9, which is called the Aristotle illusion because it was first discovered by that philosopher. Place a marble or pencil between the crossed fingers. You will seem to feel two objects instead of one. In our ordinary experience the opposite surfaces of two fingers never touch one object at the same time. So trained are their nerves in this regard that they mistake the strange stimulus given them here and transmit a deceptive message.

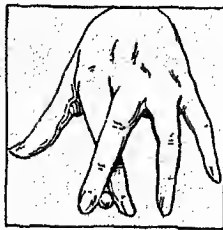


Fig. 9. Hold a small marble as shown above and you will feel two marbles instead of one, a tactile illusion.

IMAGINATION. It is pleasant to lie on the grass on a warm spring day and gaze up at the clouds, seeing in them first a face, then an animal, then another object and another. In these reveries we are duplicating one of the famous experiments carried on in the psychological laboratory. There the person taking the test must look not at clouds but at ink blots like those pictured here and write down, within a given time, as many as possible of the things he sees. It is imagination which enables one to see things not actually in the ink blot or the cloud.

Thinking, when it concerns itself with objects or events outside our personal experience, is imagination. Sometimes imagination is defined as the making of new combinations of old experiences. I remember the horse which I saw yesterday and likewise the man. But if I put the horse and the man together and think of a mysterious creature with the body of a horse and the head of a man, I am imagining. Even the writer of the most fantastic tales puts elements of past experience into his characters. Though he may write about one-eyed monsters, three-legged men or Lilliputians, his characters throughout are made up of elements which we all know. Eyes, legs, smallness are not new; the combination only is new.

Imagination plays an important part in the kind of thinking which solves a practical problem. The fancies which enable an Edison to give the world an electric light represent imagination brought into control and made to work to a useful end. If we are puzzled about where to get the wheels needed to make a scooter and suddenly think of taking them off an old roller skate, we are using this same kind of imagination.

In almost any line of endeavor, imagination of the kind which gets results is necessary. It is made up of two factors. First is the ability to think of new combinations of experiences. Second is the ability to select those combinations which are best. The person who has only the first of these is a flounderer and a failure. The person who can criticize but cannot strike out new ideas is equally handicapped. Modern scientific method has added a third requisite to these two—experiment or test to answer the practical question, "Will it work?"

In science, discovery, and invention, in art and literature and business, these three processes are at work—imagination, self-criticism, and experiment or test. All progress, past and future, depends on man's ability to perform this threefold task, and to profit by relating them to the work at hand.



A drop of ink pinched into a fold of paper makes queer silhouette pictures. Why do they look like pictures? Just your imagination.

LITTLE TALKS ON GREAT THINGS *by Arthur Mee*

IMAGINATION

IS NOT imagination the greatest thing in all the world? Is it not at the very heart of all the great things that men have ever done?

Did imagination not give us America? Far back in the centuries this continent was an idea in the minds of some Viking sea-rovers—it was a piece of imagination. Once again it was an idea in the mind of a boy standing in the harbor at Genoa to watch the ships go out—it was part of the imagination of Columbus. Still again, the idea of a great free republic on a continent almost unknown was an idea in the minds of a hundred people who fled from the tyranny of James Stuart in England—it was part of the imagination of the Mayflower men. So, if we think of it, the whole of today is part of the imagination of yesterday, and tomorrow is the imagination of today.

Think of the men who work in things unseen—the great kings of science who peer into the invisible, who weigh the earth and measure the stars, who ponder over the mystery of life itself until they seem to be almost solving it, when the secret slips away and men still ask where life came from and where it goes and what it means. Will they find it out one day? The little crystal that the chemist makes—will it one day come alive? Will these men give us longer life, or kill disease, or drive back death? So the events of every hour thrill the imagination of whoever is not deaf and dumb and blind.

What are pictures and music and books if they do not stir the imagination within us? We listen to the mighty dramatization of sound that we call Handel's 'Messiah', and feel the power and grandeur of great natural forces. We look on the materialization of a vision that we call Raphael's 'Transfiguration', and we feel stirring within us the spirit of the solemn scene it represents. We read the immortalization of piercing anguish in Mrs. Browning's 'Cry of the Children', and we feel ourselves back in another age, listening to the beating hearts and sobs of little ones whose graves have been green these many years. The old, old story that thrills us as we sit remembering by the fire, the book that stirs the mind and opens up another world of thought to us, the picture on

the wall that grips the heart as in a vice—what are they but examples of imagination working in us across the earth and through the years? They carry the mind to far-off places and to other days.

Do we not all understand, when we are reading a great story or a beautiful poem, that we have jumped up behind a genius, as it were, and that he is taking us for a ride on his winged horse, Imagination? And do we not also understand that if we ourselves have not a great imagination in our souls we could never enjoy that magic ride? There are those who cannot read poetry, who see nothing beautiful in Nature. Poor, dreary souls! They have no imagination. Without imagination we lose half the fun and all the truth and all the beauty and all the glory of human life.

Somebody has said that a child takes up a twig and calls it a king, and it is true that the imagination of a child is a supreme and wonderful thing. A child knows better than all the grown-ups in the world that this beautiful and romantic earth is not the real thing, that there is in fact a much more beautiful and much more romantic world all about us if we have eyes to see it and imagination to enter into it.

Poets have the same feeling. Keats said that "pleasure never is at home," and bade us "open wide the mind's cage door," so that imagination might fly away with us to the true world of beauty and delight. Wordsworth spoke of human life as the shades of a prison, and said, in those noble words that will not die:

Our birth is but a sleep and a forgetting:
The soul that rises with us, our life's Star,
Hath had elsewhere its setting,
And cometh from afar:
Not in entire forgetfulness,
And not in utter nakedness,
But trailing clouds of glory do we come
From God, who is our home:
Heaven lies about us in our infancy!

That heaven of the child is the imagination that stirs within him; and for all of us, as we come into this world and move through it in joy and sorrow, the power of imagination to shape our destinies and bring us happiness is infinite beyond all words. He is rich who, knowing little, has a great imagination; he is poor who, knowing much, has none.

SEEKERS of FREEDOM—*The* PEOPLING of the NEW WORLD



At Ellis Island in New York Bay these Polish girls, holding tight their worldly possessions, are waiting in line for their final examination. The card, which can be seen plainly in the hand of the first girl, bears a number identifying her to the inspectors. A preliminary physical and mental examination, to prevent the unfit from seeking admission, has taken place abroad.

IMMIGRATION. Only the Indians can properly call themselves native Americans, and even they are believed to have come from Asia centuries ago. All the rest of the people of the United States are immigrants or the descendants of immigrants. Even Americans of Revolutionary stock, if they trace back their ancestry, will discover that their forefathers were born in Europe. One out of every three of the present population of the United States is either foreign born, or born of foreign or mixed parentage.

America was peopled by Europeans who came to the New World to find freedom: religious freedom, political freedom, and economic freedom. Puritans and Pilgrims, Catholics, Quakers, French Huguenots, and German Mennonites all found a religious as well as political haven in the New England and middle colonies. To the Southern colonies came traders and settlers eager to seek relief from economic stress. Most of this immigration came from the British Isles. In 1790, when the first United States census was taken, 91 per cent of the people were of British descent; and nine-tenths of those of British descent were English. (*See American Colonies.*)

Up to 1820 immigrants came at the rate of perhaps five or six thousand a year. After 1820 the rate steadily increased, until by 1830 new arrivals numbered more than 20,000 yearly; and now they were coming from other countries of Europe. The tide continued to swell year by year, until in 1854 it reached the prodigious number of 428,000. The same forces that had peopled the colonies were at work: political and religious persecution, and poverty.

Sturdy German farmers swarmed into Illinois, Wisconsin, and Missouri as early as 1830, when land

sold at \$1.25 an acre. Norwegians and Swedes followed them during the next few decades and many of them found new homes amid congenial surroundings in Minnesota, the Dakotas, and Wisconsin.

Famine in Ireland in the early 1840's, brought on by the failure of the potato crop, caused the death of thousands from privation. American relief ships sent to the impoverished isle with food returned laden with immigrants. Having but little money, these newcomers settled first in New York and Boston; some furnished unskilled labor for factories and mines; others drifted west with construction gangs. The Irish were ambitious, especially for their children. Many of the sons became contractors, policemen, and politicians. Many of the daughters, through sacrifice on their mothers' part, qualified as school teachers.

Refugees Seeking Safety

At about the same time, the collapse of a revolutionary movement in Germany forced thousands of bold spirits to seek safety in America. These refugees were men and women of lofty ideals. Not a few were university students or graduates. Those who sprang from the soil were excellent farmers. They brought with them their continental customs and their music, and have left an indelible impress on such cities as Chicago, Milwaukee, Cincinnati, and St. Louis. In succeeding decades the German and Irish tides united with those from Denmark, Norway, and Sweden.

Immigration was slowed up by the Civil War though in the midst of this conflict, Lincoln launched a plan to stimulate it and to find new settlers for the frontier states. Free homesteads were offered to any foreigner who would take out his first citizenship papers. In 1864 a Commissioner of Immigration was

installed at Washington, with an assistant in New York, to scatter information about free lands and to assist arriving home-seekers. Many of the states made special efforts to attract settlers and even sent agents to European ports of embarkation to recruit them. Western railroads competed with the states to induce immigrants to take up the land which had been granted them by the government to finance their construction work.

Farm Workers Were Welcomed

A further impetus to European immigration was brought about by agricultural distress on the continent in the 1880's. Wheat from Minnesota and the Dakotas was underselling European grain even in the district where it was grown, and the European farmer was bankrupt. At the rate of 500,000 a year, the agriculturists of northwestern Europe poured into the Mississippi Valley and toward the Pacific coast.

At first, the United States held out open arms to the stranger. There were canals to be dug, railroads to be built, minerals to be mined, forests to be cut, farm lands and prairies to be cultivated, great industrial plants to be manned.

Until the 1880's immigrants were drawn principally from northwestern Europe. These Irish, Scots, Swedes, Norwegians, Danes, Dutch, and Germans mingled well with the people already here. They brought their families with them. They were eager to become citizens. Stalwart, courageous, and upstanding, they were, as a rule, intelligent, educated, and skilled in the use of tools.

About 1882 a significant change came about in the character of the immigration. Arrivals from southern and eastern Europe, which had numbered only one-tenth of the total, began increasing. Twenty-five years later this proportion had increased to eight-tenths. Italians, Rus-

sians, Lithuanians, Ukrainians, Poles, Greeks, Bohemians, Hungarians, and Russian Jews came in ever greater numbers, and from 1905 until the World War, a million a year entered the United States.

The "new immigration" differed from the old in several respects. It was made up largely of unmarried men or of men who had left their families in Europe and planned to return to them when they had saved a little money. They were largely illiterate; and they were not so easily Americanized. Many of them had no intention of becoming citizens. They had a tendency to be clannish, to live together in the same part of a city, and to cling to their national customs. They became easy tools in the hands of unscrupulous politicians. Their standard of living was

far below that of their predecessors, and they were content to live in slums and tenements.

The American people became alarmed. They questioned the wisdom of allowing the country to become the dumping ground for Europe's surplus population, many of them inferior in intelligence and moral standards and hard to make into Americans. The open door began to close. In 1882 the first restrictive law was passed. It excluded such undesirables as lunatics, idiots, convicts, immoral persons, paupers, and persons likely to become public charges. Three years later, the Alien Contract Labor Law prohibited American employers from importing workmen from Europe under contract. The acts of 1903 and 1907 added restrictions. Control of immigration was first vested in the Department of Commerce and Labor. In 1913 it was transferred to the new Department of Labor, and in 1940 to the Department of Justice. A literacy test was added by the Act of 1917.

After the World War of 1914-1918, unemployment in Europe, together with the heavy burden of war debts placed on the people, caused eyes again to turn longingly toward the most prosperous country in the world. In 1920, despite restrictions, 430,000 came.

Unemployment, however, was also widespread in the United States and the flood of newcomers added to

the difficulties. The brakes had to be applied, and in 1921 the first quota law was passed, which limited the number of immigrants from any European country to three per cent of the nationality in the United States in 1910. Nationality was determined by the country of birth. No limits were placed on immigration from other countries in the Americas.

Even under this law, the numbers admitted had reached a half million by 1923, and a further reduction was authorized in the law of 1924, which fixed the rate at two

per cent based on the 1890 census. This reduced the number of immigrants to 180,000 the next year. No country was given a quota of less than 100. Orientals were excluded. But still immigration from the Western Hemisphere continued at an alarming rate.

Quota Based on the 1920 Census

After three years of this, a new quota was established, based on national origins of those living in the United States in 1920; and the total was cut down to 150,000 annually. Under this new quota, England, northern Ireland, and Italy got preference over Germany, southern Ireland, and the Scandinavian countries. This went into effect July 1, 1929.

American consuls abroad, who now have the responsibility of accepting or rejecting immigrants, are

OLD CUSTOMS IN A NEW LAND



Here a Jewish clothing merchant is carrying on business in the homeland manner—at an open-air stall in Chicago's noted Maxwell Street market. If she prospers, she will open a store in the American manner.

instructed to withhold visas (the right of admission) to all who have no immediate prospects of work or who might become public charges. Thus in one month recently visas were issued to only six per cent of those otherwise eligible under the quota law; and it frequently happens that more leave the country during a given month than are admitted.

Ellis Island, once the world's greatest immigrant receiving station, now frequently receives in a month more aliens collected for deportation to their homelands than immigrants. Aliens may be deported if they have become paupers, if they have been convicted of a crime, and for various other reasons. Once deported, an alien is not permitted to return.

Certain classes of foreigners who come to the United States are not affected by the quota laws. Ambassadors, consuls, and government officials are admitted freely with their families and servants. Tourists, students, merchants, ministers, and professors are permitted to enter for a limited period. Other non-quota immigrants include the wives and the unmarried children (under 18 years of age) of American citizens, and aliens once legally admitted who are returning to the United States from a visit abroad.

Quotas are not applied to immigration from Canada or Latin American countries. Until 1929 Mexicans came in large numbers, particularly for common labor in the Southwest. More than 77,000 entered in 1927, the peak year. When business depression reduced the demand for common labor, the rule against admitting immigrants likely to become public charges reduced the inflow to less than 2,000 a year, and many of those already in the country returned to Mexico.

Immigration of Oriental Races

Immigration from China and Japan has presented a different problem. Chinese began coming to the Pacific coast in numbers after the 1849 gold rush to California. They did the hard labor in mines, on ranches, and in railroad construction. At first they were welcomed, but opposition grew after the hard times of 1873, when white men were out of work, while the Chinese were employed because they worked longer hours for less pay. Anti-Chinese riots in 1880 brought matters to a crisis, and in that year a treaty was entered into with China whereby Chinese coolies (common laborers) were debarred from the United States. This was supplemented in 1882 by an act which excluded Chinese from naturalization.

A new migration from the Orient developed with the introduction of Japanese coolies on the fruit ranches in California, and again the white population

was aroused against the "yellow peril." In 1906, Japanese school children in San Francisco were compelled to attend the oriental school in Chinatown. The Japanese resented this discrimination, and the situation led to the adoption of a "gentleman's agreement" between President Theodore Roosevelt and the Japanese government, whereby the latter undertook to prohibit coolies from coming to the United States. This, however, did not satisfy the Pacific states. Consequently, in 1924 a law was enacted excluding from

immigration all aliens who are not eligible to become citizens. This law bars the Japanese from immigration, since only white persons and those of African birth or descent may be naturalized. (See also Americanization; Citizenship.)

World Immigration Problems

Australia, Canada, South America, and other thinly populated regions long encouraged immigration, barring only the physically and mentally unfit, people who were likely to become public charges, and in some cases Orientals. Crowded countries, on the other hand, frequently helped their surplus peoples to emigrate to their overseas possessions or to other countries. The period of free

movement of people from country to country, however, passed with the World War of 1914-1918.

Everywhere today immigration is strictly regulated by law. Nations which still need people want immigrants who will readily become assimilated with their populations, and they want particular classes of workers. Many South American nations need farmers and skilled industrial workers, but they try to keep out those who might take work from nationals. The British dominions have tightened their laws. Canada and others bar not only Orientals but Europeans from certain nations. France, depleted of man power by the World War of 1914-1918, brought in various kinds of labor from "emigrant" countries—Italy, Poland, and others. Paris and its environs became a haven for political refugees from many nations. In 1924 France began drastically to limit immigration. Political and religious persecution in Europe in the following decades brought new immigration problems to many countries (see Migration of Peoples; Jews).

Great Britain, in addition to limiting entries, sought to direct British emigration toward the dominions and colonies. Totalitarian nations followed a mixed policy. They restricted emigration to preserve man power, both directly and by severe restrictions upon taking money from the country; but they also sent small numbers of selected emigrants abroad to strengthen the political and trade interests of the home country.

NEW FOODS FOR AMERICA



Unusual "foods from home" are always on sale in markets patronized by the foreign born, and Americans learn of them—as here an American boy learns from a Mexican about cactus leaf.

A New American—The Story of Mary Antin

A LITTLE girl with bright starry eyes stood at the rail of a great ocean steamer one glorious May morning and watched the shores of the promised land, America, creep nearer and nearer. She was 5,000 miles from her old home in far-away Russia but she was not afraid. Her mother, brother, and two sisters were with her on the ship, and on shore waited her father who had left home three years before to try his fortunes in the New World. And then was not this America, the wonderful land where no one was looked down on because he worked and where even the children of the poor could go to school?

Can you wonder that this little girl was excited when, after six weeks of travel through strange cities and across the ocean, she at last arrived at her new home? And what a strange home it was! After they had got safely by the immigration officers and joined their father, he took them in a rickety cab to the place he had rented in the slums of Boston. On the way he told them not to lean out of the windows and not to point at things, for if they did, people would know that they were "greenhorns" and not Americans.

Why Maryashe Changed Her Name

To be Americans was the one desire of the whole family. And one of the first things to do to realize this ambition was to take American names. Our little girl had been named "Maryashe" at home and that would do very well shortened to "Mary." This was a bitter disappointment, for she did so want a strange-sounding American name like the others. For instance, her elder sister, Fetchke, came forth as Frieda and baby Deborah as Dora. But there was one consolation. Here she could use her surname all the time and not on state occasions alone. And so she felt very important to answer to such a dignified title as "Mary Antin."

With their old names the family exchanged their queer old home-made European dresses, which pointed them out as "greenhorns" to the children on the streets, for real American machine-made garments bought in a dazzlingly beautiful palace called a "department store."

The most wonderful thing happened on Mary's second day in her new home. A little girl from across the alley came and offered to take the children to school. Then it really was true that in America any child could get an education! There was no application to be made, no examinations to pass before you could enter, no fees to pay. But as school was almost

over for the year their father decided that they had better wait until September to start. When September came their father took them himself. And Mary was no more eager to enter school than her father was to have her secure an education. In his excitement that morning he walked so fast that the children had to run to keep up with him. Finally they stood around the teacher's desk, and Mary's father in a few broken words explained his hopes for his children.

AMERICANS IN THE MAKING



The postman is delivering mail to immigrants detained on Ellis Island in New York harbor. The women are sewing to pass the hours of waiting at the gateway of a new world. Eager to adopt American dress and manners, the newcomers are provided with free sewing materials and instructed in the ways of Uncle Sam.

Although Mary was 12 years old she had to start in the first grade, for she knew no English and had never been to school before. But she was so anxious to learn that she advanced rapidly. Only one thing bothered her. That was the little word "the." She had a hard struggle not to say "zee." But she made her tongue stop buzzing when it said "the" and within a week she was advanced to the second grade. Oh, how proud Mary was four months later when her teacher showed her a paper with her name "Mary Antin" printed in it. For the teacher had sent something Mary wrote to a paper that had printed it. And even a little girl born in America might have been proud to write so well.

"Dingy? It's Beautiful!" Thought Mary

All this time Mary was being made into an American. Dingy little Chelsea, where her family now lived, was beautiful to her. The sight of the letter-carrier or the fire-engine made her happy and proud for they were part of her America. But she was happiest when in her second year in school—she was now in the sixth grade—the class began to study the life of Washington. The reader, the arithmetic, the song book, that had been so fascinating before, suddenly became dull books after she found the story of this great man. When she read the story of the cherry tree and of how the boy Washington would

not tell a lie to save himself from punishment, she resolved that she would follow his example. But even if she never, never told a lie she could not compare with George Washington. He was brave, and she was afraid to go out when the snow-balls whizzed. And she could never be the First President of the United States.

There was one cheering thought in all this. Though she never could be as great as George Washington, she was, as one of her books said, a "fellow-citizen." Her father explained to her how he had become a citizen by naturalization and how, because she was his little daughter, she was also a citizen. This was rather a sobering thought. "If I am a Fellow-Citizen," she thought, "then I must act as a Fellow-Citizen should."

When her class stood up to sing 'America' Mary shouted with all her might, and she meant every word of it when she sang:

I love thy rocks and rills,
Thy woods and templed hills!

As they began to prepare a program for Washington's birthday, Mary decided to write a poem. It was hard work, for poetry, you know, is not always easy to write, and Mary frequently had to pick the words she wanted out of the dictionary. Perhaps it wasn't very good poetry, for Mary herself long afterward laughed at it. But when you think that a little girl 13 years old, who had not been in school two years, wrote it, and that it expressed her love for her new home and for its history, it is wonderful. Here are two of the stanzas of it:

He whose courage, will, amazing bravery,
Did free his land from a despot's rule,
From man's greatest evil, almost slavery,
And all that's taught in tyranny's school,
Who gave his land its liberty,
Who was he?

'Twas he who e'er will be our pride,
Immortal Washington,
Who always did in truth confide,
We hail our Washington.

Mary read her poem in her own room at school and then was sent to other rooms to read it. Everyone thought it wonderful that a little girl who had been an American for so short a time could do so well. Somebody suggested that it should be printed and so Mary, without saying a word to her father and mother, took it to a newspaper office. At the first office no one would pay any attention to her. But at the second she had better luck. The editor promised to print it and send her a copy of the paper with it in. He asked her many questions about herself. By and by the paper came.

You can imagine how happy Mary was. And her family were as proud of her as they could be. Her father bought all the papers he could find and gave them to friends. They were all sure that some day Mary would be great. Because of this belief they kept Mary in school.

This was not easy because the family were very poor. Sometimes they had nothing in the house to

eat. They moved from one tenement to another in search of a cheaper place, and many times angry landlords threatened to turn them into the street because they could not pay the rent.

Mary helped all she could on Saturdays and in the evenings, but she could not do much for she was not very strong. But while she was going to school, or reading in the library, she was really getting ready to help her family. And finally the day came when she not only could help them live better but also by her book 'The Promised Land', helped other new Americans by telling the story of how she was made into an American.

IMMORTELLE. These odd plants with dry, papery flowers and stiff erect stems are common garden plants in most parts of the world. In ancient times a few species, originally used as decorations for graves, were grown in the lands along the Mediterranean. There the favorite kind was a yellowish-white flower, which was sometimes dyed before being made into bouquets, wreaths, or crosses.

The commonest of the immortelles (or everlasting) are the strawflowers (genus *Helichrysum*), which have crisp orange, maroon, yellow, and white bracts, and are used in winter bouquets. These plants grow best in an open location. They reach a height of about 20 inches. The flowers are gathered before the scale-like leaflets are fully expanded so that the dried heads will retain a half-open appearance. Other everlastings are the ammobium, or winged everlasting, with yellow flowers; the anaphalis, or pearl everlasting, with gray-white clusters of small flowers; and the xeranthemum, or common immortelle, with lilac or rose flowers. This last is perhaps the earliest plant called "immortelle."

All the plants mentioned above are members of the composite family. Some everlastings belong to other plant families. Among them are the white or red clover-like globe amaranths (genus *Gomphrena*), the wiry clusters of the sea pinks, or statice (genus *Limonium*), and certain ornamental grasses.

IMPEACHMENT. The word "impeachment," from old English law, usually means a formal accusation brought against a public official with the object of removing him from office. The act of impeachment lies in the accusation itself, and a man is said to have been "impeached" even if acquitted of the charge. The Federal Constitution makes the president and all other civil officers of the nation subject to impeachment for "treason, bribery, or other high crimes and misdemeanors." The House of Representatives by majority vote must bring the impeachment (that is, make the accusation). The Senate, sitting as a court of impeachment, tries the case and judges the officer's guilt. There is no appeal from its decision. The penalty in case of conviction is removal from office and disqualification for further public service. A number of impeachment cases have come before the Senate (see the table on I-238). One was that of a president—Andrew Johnson—who was acquitted.

Impeachment is provided for in the constitutions of most of the states also. It has been superseded to some extent by the "recall," which in some states allows the voters to vacate any office before the expiration of the officeholder's term.

INCAS. Scattered over the central highlands of the Andes Mountains of South America are found the remains of massive stone temples, palaces, fortresses, terraces, and dwellings, with pottery, textiles, and gold ornaments. These are the only traces so far discovered of the ancient civilization of the mysterious Incas, a branch of the Peruvian Indians that held sway for 1,200 miles from Chile, north through Peru and Bolivia into Ecuador.

The Incas, or more properly the Quichua, were rapidly extending their power when the white men arrived. Their ancient home was in the valley of Cuzco, but about the beginning of the 14th century they extended their rule over an enormous territory. They left some remarkable monuments. Above Cuzco in Peru, their ancient capital, tower stupendous ramparts made of individual stones of prodigious size. No mortar was used, yet after centuries these stones lie so cunningly fitted to each other that it is impossible to insert the blade of a knife between them. Some are 20 feet high and weigh many tons. Ruins like these occur in many parts of the Andes, together with remains of stone causeways and carefully terraced fields, all telling of a strong and highly gifted race. Rude records were kept by means of a system of variously knotted and colored cords (called *quipu*), but the Incas were ignorant of writing. Later accounts, of doubtful reliability, ascribe to them a remarkable social organization, in which the land was allotted by the state in small holdings, irrigation was extensively practiced, and poverty was

unknown. The ancient population was said to be between 8,000,000 and 12,000,000.

The Incas were skilful weavers, and seem to have been proficient in every style of hand weaving we know today. They also knew how to smelt metals and cast in molds; and in the making of pottery they were artists. Evidently, also, they had made some

progress in music, for among the remains of their civilization are found flutes made of bone and of cane, clay trumpets and trumpets of shells, bells of different tones, some made of bronze, some of pure copper. They built paved roads, with suspension bridges and post-houses at intervals over the wildest mountain ranges and through the desert for hundreds of miles.

The fall of this thriving and industrious state before Pizarro and his handful of Spaniards, beginning in 1532, forms one of the tragedies of history. The spirit of the people was broken, and after disastrous rebellions they fell into the submissive apathy which marks the Peruvian Indians of today. Slaughter and oppression, continued through centuries, thinned their numbers until the pure-blood descendants of the Incas are estimated now to be fewer than 3,000,000. (See Peru; Pizarro.)

INCOME TAX. A direct tax greatly used in modern countries, including the United States, as a means for defraying the increasing expenses of government with least

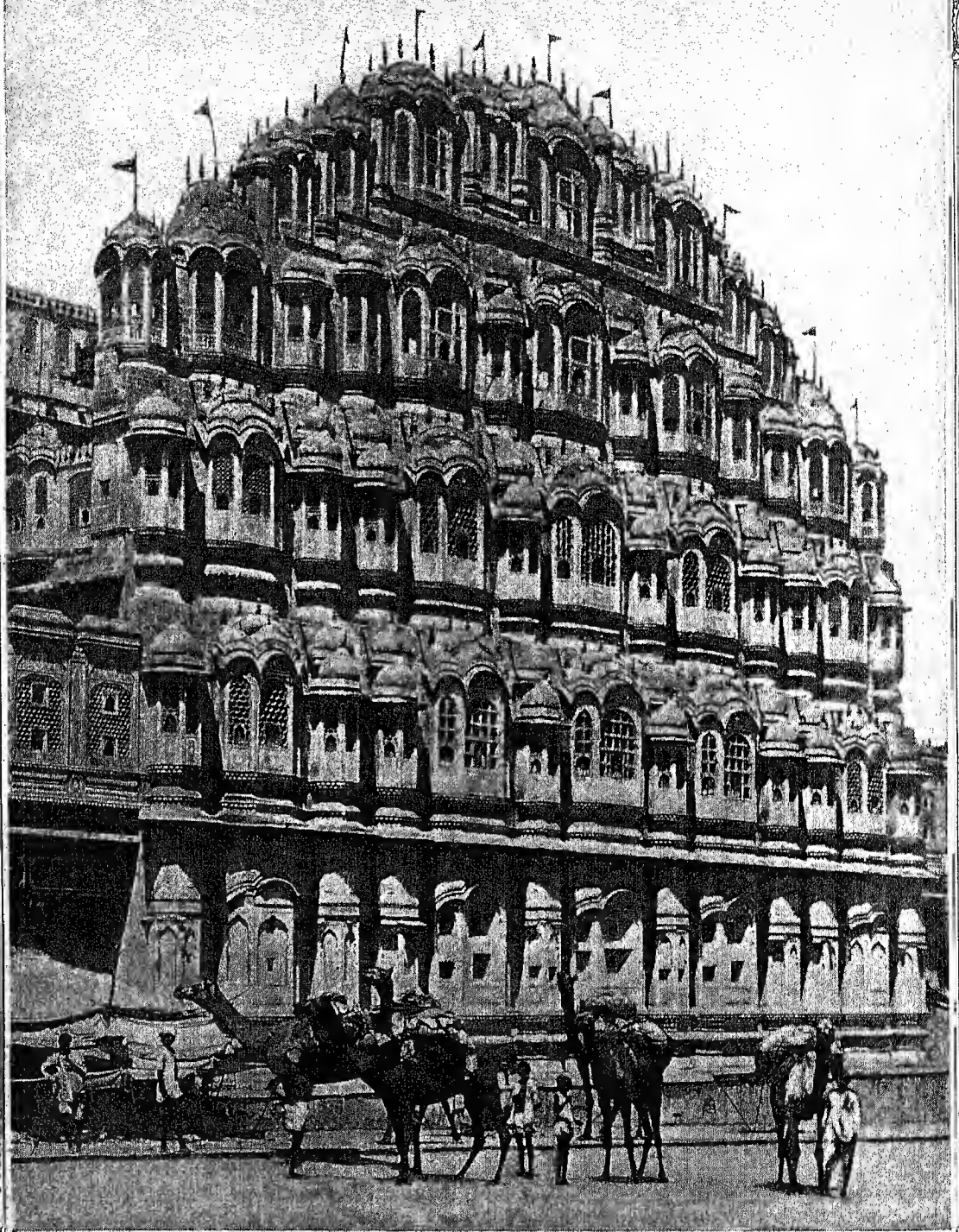
hardship to individuals. Usually incomes below a certain amount are exempt and the rate of taxation increases with the amount of income. The income tax became a permanent part of the British fiscal system as early as 1853. In the United States, however, this tax was not adopted until 1913, after an amendment to the constitution had been passed, permitting such a tax to be imposed. (See Taxation.)

IN THE ANCIENT CAPITAL OF THE INCAS



The walls of many of the houses in Cuzco, Peru, capital of the ancient empire of the Incas, are extensions of the remains of the old Inca walls. The stones in the lower half of the buildings in this picture were set by Inca masons, perhaps before Columbus discovered America. The strength of these massive walls testifies to the high skill of the old Indian architects.

AN INDIAN RULER'S PALACE



The elaborate Hawa Mahal, or Hall of the Winds, in Jaipur, has been called "a vision of daring and dainty loveliness." Under the dazzling Indian sun it glows like a jewel, for it is faced with pink stucco. The many latticed and glassless windows admit the faintest breeze on hot summer days. The building is a part of the maharajah's palace which, with its gardens and artificial lakes, covers a rectangle about a mile wide and one and one-half miles long. It was built in the early 18th century.

The TEEMING MILLIONS of BRITAIN'S INDIAN EMPIRE



This picture takes you into the very heart of the story of India. It presents two of the most important aspects of that mysterious land—its crowded population and the powerful influence of its ancient religions. For here we see a dense throng of pilgrims bathing in the holy tank at Kumbakonam in southern India. They believe that this tank is connected by a subterranean passage with the sacred Ganges River, 1,200 miles distant, and that once in twelve years the holy waters flow into it. On that occasion the Mahamagham festival is held, and worshipers from all parts of southern India come to wash away their sins. But from the polluted waters they may carry back to their homes the germs of cholera and other diseases, for Western medical science makes little headway against the ancient conservatism and superstitions of the East.

INDIA. A land of fascinating and infinite variety is India, which thrusts 1,900 miles downward from the Himalaya Mountains into the Indian Ocean and is inhabited by almost one-sixth of the human race. And what contrasts among these crowded people! They are divided into numerous races and clans; they speak 180 distinct languages with 550 dialects; they profess countless shades of religious beliefs; they are split into more than 2,000 social castes; and they are grouped into more than 700 provinces and petty states. Despite their civilization reaching back 5,000 years, more than 90 per cent of these people cannot read or write in any language. Some of the more powerful Indian princes, with their secret stores of gold and silver and precious stones, are among the most wealthy men in the world; yet the average per capita income of the people is about \$20 a year. Unbelievable poverty reigns for the most part. Thousands die of starvation almost every year, and

Extent.—North to south, 1,900 miles; east to west, 2,000 miles. Area, about 1,575,300 square miles. Population, over 350,000,000.

Natural Features.—Himalaya Mountains, the highest in the world (20,000 to 29,000 feet); Vindhya Range and Eastern and Western Ghats, inclosing the Deccan plateau; deserts in Sind and Rajputana. Principal rivers: Indus, Ganges, and Brahmaputra.

Products.—Rice, wheat, cotton, millet and pulse, rape and mustard, groundnuts, sesamum, jute, linseed, sugar, tea, castor seed, barley, indigo, rubber, and coffee; coal, petroleum, manganese, gold, lead, silver, salt, mica, and iron ore; cotton and silk manufactures.

Cities.—Calcutta (1,490,000 population), Bombay (1,160,000), Madras (650,000), Hyderabad (470,000), Delhi (capital, 450,000).

History.—Aryan invasion, about 1500 B.C.; rise of Buddhism, 6th century B.C.; Alexander the Great's conquest of the northwest, 327 B.C.; Mohammedan conquest, 1001 A.D.; establishment of Mogul Empire, 1526; English East India Company obtained trading posts at Madras (1639), Bombay (1668), and Calcutta (1696); Battle of Plassey established British supremacy over the French, 1757; expansion of British India, 1774–1856; Indian Mutiny, 1857; British Crown takes over government from East India Company, 1858.

thousands more, weakened by hunger, fall victims to the plague.

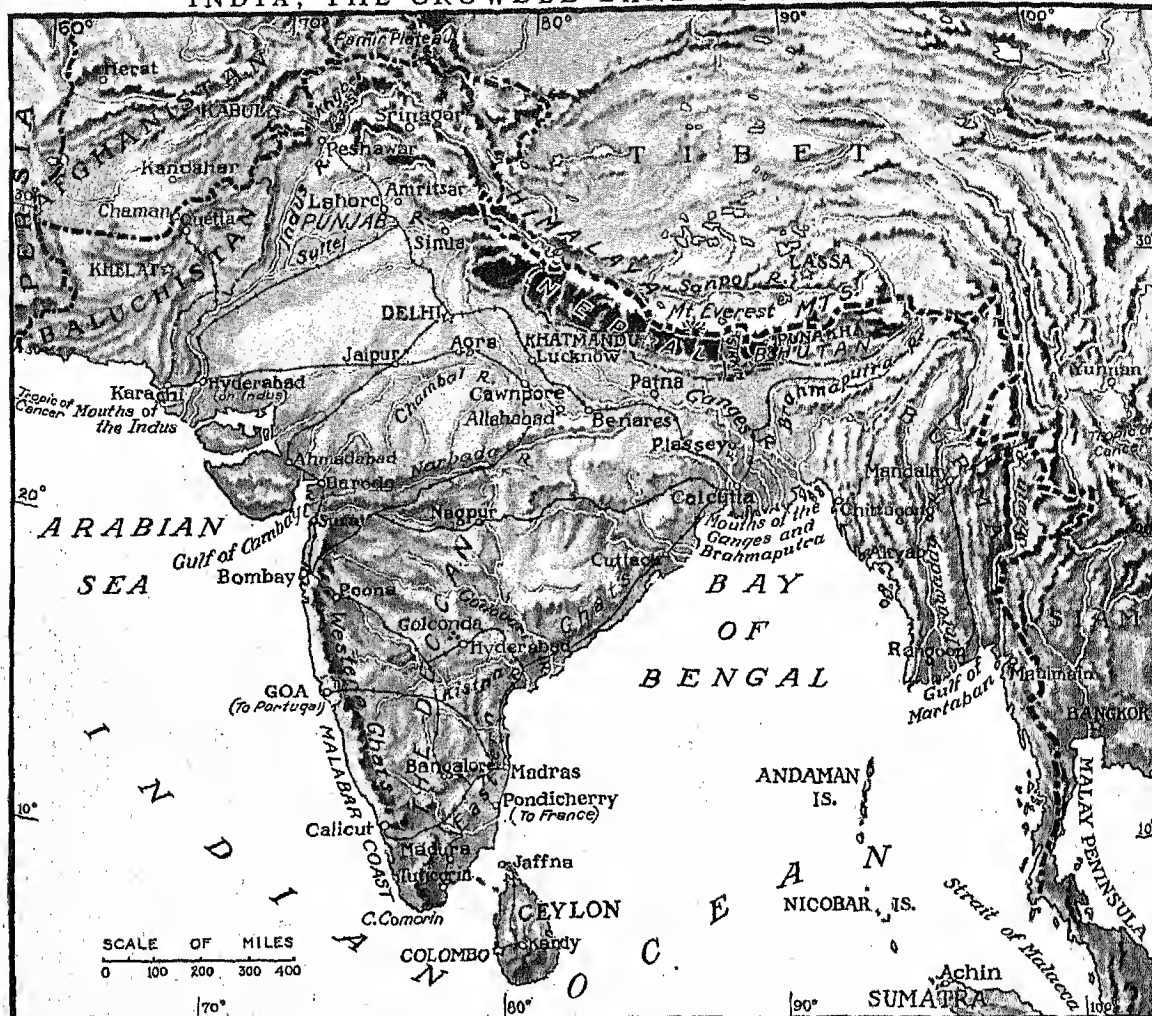
The land itself presents almost as many contrasts as the people. In the north the granite peaks of the Himalayas, the highest mountains in the world, are cloaked in eternal snows (see Himalaya Mountains), while in the extreme south Cape Comorin dips its

coral-studded foot into warm tropical waters. Between these two extremes are found cool hill regions as well as suffocating jungle lands; barren deserts and also river valleys of unsurpassed fertility.

The Divisions of India

A broad view of the country shows four separate and well-defined regions. The mountain and hill districts of the Himalayan ranges, and the slopes of the Afghanistan and Baluchistan highlands form the northern and northwestern borders. Then come the great river plains of the Indus, the Ganges, and the lower Brahmaputra, forming a broad belt from the head of the Arabian Sea to the head of the

INDIA, THE CROWDED LAND OF CONTRASTS



India, a land of contrasts in people and topography, is here spread out before us. It is shut off from Tibet by the famous "Roof of the World," the Himalayas, with their eternal snows. To the north and west are the slopes of the highlands of Afghanistan and Baluchistan. Then come the great river plains; next the vast tableland known as the Deccan with the giant stepping stones, the Ghats, sloping down to the eastern and western coasts.

Bay of Bengal. Next is the great tableland known as the Deccan, which begins where the Vindhya Mountains and their connecting ranges rise from the Ganges plain and includes the southern half of India; it is bounded by the range of hills known as the Eastern Ghats (literally, "stepping stones") sloping down to the Coromandel Coast, and by the Western Ghats descending to the famous Malabar Coast. On the other side of the Bay of Bengal, to the south of the Brahmaputra valley and extending far down along the west side of the Malay Peninsula, is Burma. This formerly was a province of British India, but was placed under a separate government in 1937 (see Burma).

The northernmost portion of India and one of the most important of the native states is Kashmir (Cashmere), which extends over the first Himalayan ranges, and includes the famous Vale of Kashmir (see Kashmir). Beyond the Indus, between Kashmir

and Afghanistan, stretches the Northwest Frontier Province—a wild rocky region, which forms a buffer between peaceful India and the untamed Afghan tribes. Here is the approach to the famous Khyber Pass, scene of many bloody encounters. The capital, Peshawar, is an important military post as well as a railway terminus and caravan trading station. Even more wild and unsettled is Baluchistan, immediately to the south, which borders Iran (Persia) as well as Afghanistan. Only the northern part, about Quetta and the Bolan Pass, is under direct British rule. Nepal and Bhutan, on the borders of Tibet, are independent states, save that the foreign relations of Bhutan are subject to British control. In Nepal is the tallest mountain in the world, Mount Everest; and here too are the famous fighting men, the Gurkhas, who volunteer in large numbers for service in the British armies.

These mountain states and border districts form a picturesque background for the far more important river plains which make up the second division of the country. Broadly speaking, the plains region extends from the delta of the Indus northeastward to the Himalayan foothills, and down the Ganges valley to the Bay of Bengal. Here is a tract of level cultivation about 2,000 miles long and from 200 to 400 miles broad, without a stone of any kind, scarcely a pebble. The soil is composed of river sand and silt, washed down through countless ages from the slopes of the mountain walls to the north.

The Indus at the west and the Brahmaputra at the east have their sources in Tibet behind the snow peaks of the Himalayas, at no great distance apart; and curving around in opposite directions include in their embrace not only the main Himalayan mountain chain but all that portion of northern

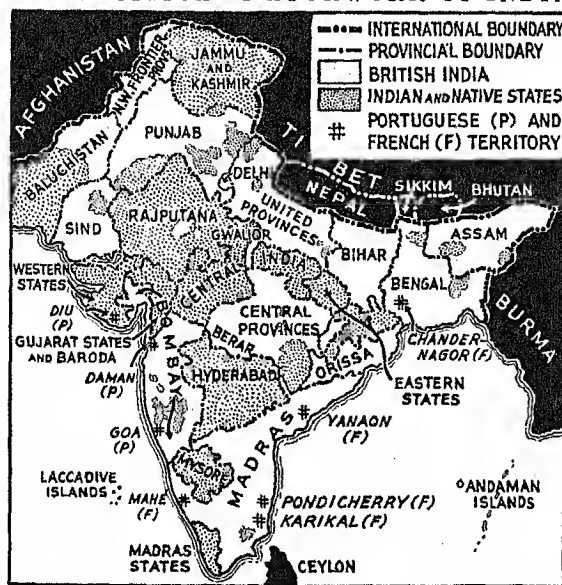
India which is properly known as Hindustan. This country, in turn saturated by warm rain, chilled by light frosts and scorched by desert winds, is the cradle of ancient Indian civilization. The Ganges valley is one of the most crowded regions in the world, many extensive districts supporting more than 600 persons to the square mile, all of whom get their living directly from the soil. By way of contrast, Baluchistan has only about six persons to the square mile.

In this rich plains region are the Punjab or "Land of the Five Rivers," with the important cities of Lahore, Amritsar, and Simla; the tiny Province of Delhi, centering about the ancient city of Delhi and New Delhi, the beautiful modern capital of all India; Rajputana, a group of native states with the cities Jaipur, Jodhpur, and Bikaner; the United Provinces of Agra and Oudh, in which are Lucknow, Cawnpore, Agra, Benares, and Allahabad; Bihar Province with its capital at Patna; Bengal Presidency containing Calcutta, the largest city in India; and Assam Province east of the Ganges.

The third division of India, the peninsula known as the Deccan, offers a marked contrast to the northern plains. The hill country begins not far south of Delhi, and spreads fan-wise southeast and southwest; while farther south a series of ranges crosses the peninsula from west to east. The Western Ghats

follow the coast closely rising in an unbroken wall to an altitude of 8,000 feet behind the old Portuguese port of Calicut. Close to the coast as they are, the Western Ghats form the true backbone of India, for from their rugged sides the whole country slopes generally eastward; the rivers which rise in their narrow landward gorges flow for the most part clear across the peninsula and empty into the Bay of Bengal. The Eastern Ghats are of no great

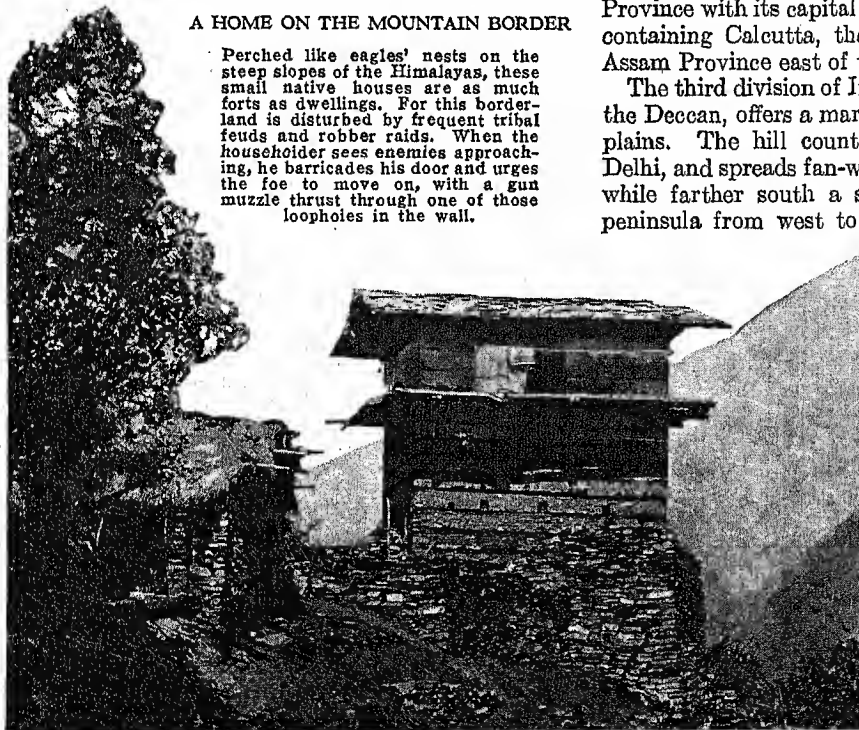
THE POLITICAL PATCHWORK OF INDIA



Many of the Indian states are completely within the British provinces. The internal affairs of these states are left largely to hereditary native princes. The territory shown in white is British India proper and here British authority holds complete sway.

A HOME ON THE MOUNTAIN BORDER

Perched like eagles' nests on the steep slopes of the Himalayas, these small native houses are as much forts as dwellings. For this borderland is disturbed by frequent tribal feuds and robber raids. When the householder sees enemies approaching, he barricades his door and urges the foe to move on, with a gun muzzle thrust through one of those loopholes in the wall.



IN THE STREETS OF JAIPUR



Isn't this a fine broad street? We are in the city of Jaipur. With its palaces and houses of pink stucco built in delicate ornamented patterns, it suggests a pictured city on the drop curtain of a stage. It is really a busy, prosperous town and quite young, as time goes in ancient India, Jaipur having been founded in 1728 by the Maharaja Jai Singh II. It is the only city in India that is laid out in straight streets and rectangular blocks.

altitude, they average less than 1,000 feet and are broken through in many places by rivers large and small, which cut deep gashes to the sea.

The central Deccan consists principally of rough hills, some covered with dense forests, others with tall jungle grass, and still others swept bare by dry winds. At intervals are broad well-cultivated plateaus, and the banks of the numerous streams are dotted with tiny irrigated farms and cleared pasture lands.

The political divisions of southern India are more confused than are those to the north. The Bombay Presidency, along the west coast, includes a large number of small native states. Its chief city is Bombay, India's second largest city. East of the Bombay Presidency lie the Indian states of the Central India Agency (chief city Indore) and the Central Provinces and Berar (capital Nagpur), under British rule. Also to the east, and in the very heart of the Deccan, is

the Indian state of Hyderabad, the most populous native state and the largest, save for sparsely settled Cashmere. Its capital is the city of Hyderabad. The Madras Presidency, the largest British province, lies at the southern end of the peninsula and extends

"ON HIS MAJESTY'S SERVICE"



Camel riders like this form an important branch of the military service of India. Notice that this man though wearing a uniform wears the native headgear, as do all the native Indian troops.

up the east coast to the Province of Orissa, which in turn extends north to Bengal. Madras almost completely surrounds the large Indian state of Mysore (capital Bangalore) and includes five other native states. The city of Madras is the third largest in India. Other important cities of the province are Madura, Trichinopoly, Salem, Calicut, and Cuddalore. This region, especially the Carnatic along the east coast, is rich in historic traditions.

The Winds of Life

Picture to yourself a typical Indian scene during the months of April and May. The burning and pitiless sun looks down upon a land sapped of its strength. The baked earth seems dead, the dried grass rusties

with the scorching breath of the wind; the very blue of the sky seems to turn brassy in the intolerable white light of noon. Doors and windows are closed to shut out the furnace blasts, and the population dozes and gasps for air. Birds with beaks open and drooping heads seek such shade as they can find. Gaunt cattle gather under the trees. A deathly silence reigns.

Presently a dust-storm advances. Behind this rise great black clouds, rolling forward like a tidal wave. The storm bursts overhead with a roar and the water strikes the ground in sheets. The great monsoon has come, the annual southwest wind which brings life-giving rains to northern India. Within a week the bleak country has become again a mass of green.

The monsoons are the salvation of the millions in India who live on the fruits of the soil. There are two of these winds, the "great" or southwest monsoon, which blows from June to October; and the "lesser" or northeast monsoon, which blows during November and December. (See Winds.) The mountainous wall of the Western Ghats causes the more southerly currents to release most of their moisture on the west coast. The winds which enter over the Sind coast do not strike a cooling mountain range until they have crossed the Sind deserts and most of Rajputana, so that they carry a great

eastern Bengal these winds meet the monsoon coming up the Bay of Bengal, and the two together sweep onward until they strike the Assam hills, where they drop their double charge of moisture. This explains why Assam has the largest rainfall of any region on earth, 50 or 60 feet a year being not unusual in the Cherra Punji district (50 inches is above the average in the United States).

As the land cools under the influence of the rains, the southwest monsoon blows itself out in October, and in November the northeast monsoon sets in. This carries rain to the east and southeast and to the central plateau of the Deccan, which, as we have seen, are deprived of their due share of the earlier moisture by the barrier of the Western Ghats. A good monsoon season means plenty of food for India, a bad

monsoon season means starvation, misery, and death for thousands of helpless victims.

In general southern India enjoys a more equable climate than the river plains or mountain regions. The latter are subject to extremes of heat and cold, dryness and moisture. In the Sind and the Thar desert are places where day after day in the summer the thermometer reaches 110° in the shade, and it is not uncommon to see a drop or a rise of 70° within 24 hours.

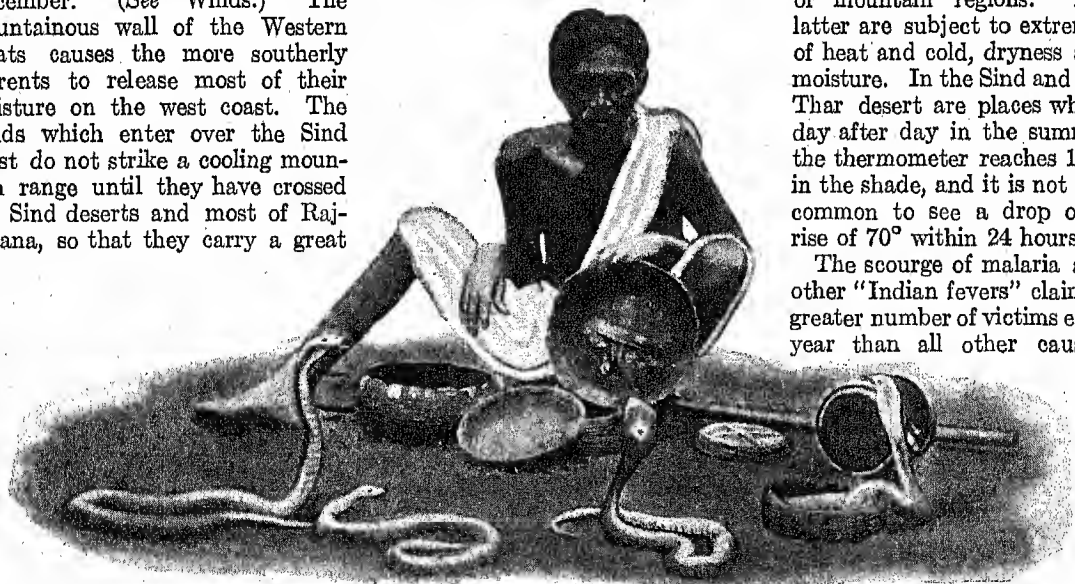
The scourge of malaria and other "Indian fevers" claim a greater number of victims each year than all other causes,

LIKE A BIRD IN A CAGE



While wealthy Indian princesses travel in jeweled palanquins, veiled with silken curtains, the poor uphold their ideas of propriety with such crude affairs as this. The young lady here could probably travel much faster on her feet, but that would be a social "faux pas."

WHAT IF THE CHARM SHOULD FAIL?



Four deadly cobras have crawled out of their baskets, as the Indian Snake Charmer hums his low rhythmic song. Three of them have reared their heads, expanding their "hoods" while they sway in time to the music. The secret of the "charm" is not thoroughly understood, but it is believed to be a form of hypnotism. Sometimes it fails and the Snake Charmer is bitten and dies.

part of their moisture far into the Punjab, or sweep eastward along the Himalayan barrier, shedding their rain through the United Provinces and Bengal. In

including even cholera and plague. Europeans during the hottest weather usually seek the high altitudes of Simla, Cashmere, and elsewhere.

The Himalayan climate is favorable to a tremendous variety of plant life. Below the snow line are found vast fields of rhododendrons, then thick forests of evergreens, and on the damp lower slopes to the east a rank and tangled undergrowth of coarse grass, bushes, canebrakes, bamboo, and great trees, whose branches are thick with orchids. The plains region is notable for the *babul*, a species of acacia, the mango, the banyan, the plantain, and the betel-palm. The northern Deccan forests consist chiefly of scrub trees, but in the south teak, sandalwood, and satinwood flourish abundantly.

Wild animals abound all over India, for religion forbids the majority of the people to kill any living creature. The tiger is found in all the wilder forest regions, and is responsible for about 500 deaths a year throughout the empire. Lions, once plentiful in Hindustan, are now confined to the Kathiawar peninsula between the Gulf of Cutch and the Gulf of Cambay. Bears are numerous in the mountains and leopards infest many of the more remote tracts. Elephants still exist in the primeval forests of the southwest, but the ranks of the domestic elephants are mainly recruited in the hills of Assam and Burma, where dwells also the rhinoceros. The *gaur* or Indian

wild ox, the wild buffalo, and wild pig offer exciting sport to the hunter in many parts of the land. The wolf, the jackal, the wild dog or *dhole*, and the striped

hyena are plentiful. Monkeys are numerous near settlements and do great damage to crops. The larger rivers are filled with crocodiles; and snakes abound in all districts, the cobra and the krait being the most dangerous and causing thousands of deaths annually. Insects are incredibly numerous. A few, such as the bee, the silkworm, and the lac-insect, are useful, but by far the greater number are exceedingly harmful or annoying pests.

The population of India may be roughly placed in five groups: (1) The descendants of the earliest known inhabitants of India, sometimes called Dravidians, who are represented by the savage Bhils and Gonds of central and western India, and by the Tamils of the south. (2) The pure-blood descendants of the successive tides of Aryan invaders who came in through the northwestern passes and conquered

the Dravidian inhabitants, and who are best represented by the Rajputs. (3) The great mass of Hindus formed by a mixture of the two preceding types. (4) The descendants of the Mohammedan invaders who began pouring in in the 7th century. (5) The Mongol or Tibetan types, which are found chiefly in the extreme northeast and in the Himalayan border regions.

The people of Dravidian stock are short, dark, with curly or wavy hair and broad noses. At the other extreme are the Rajputs, tall, slender, and handsome. Most Hindus range between these two types.

The many separate languages of India can be generally divided into those derived from the ancient Sanskrit and those from the early Dravidian tongues, with a mixture of Malay and Chinese elements. In northern India the interstate and intertribal dialect is Hindustani or Urdu, a blend of Persian with the dominant "Hindi" language.

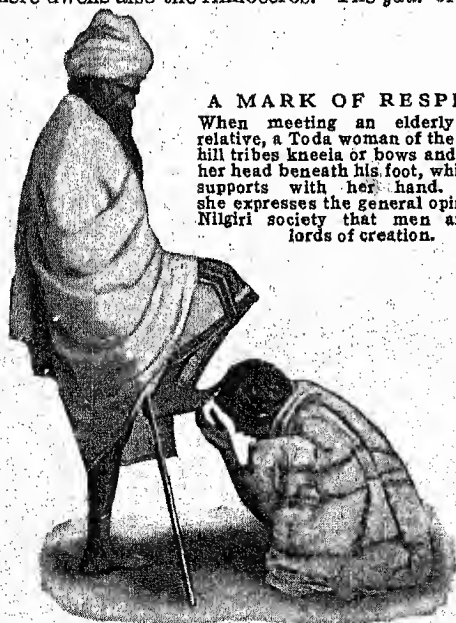
But it is not so much linguistic or racial differences which divide the people of India as differences of religion. The chief of these are Hindu, Mohammedan, Buddhist, Sikh, Jain, Christian, and Parsee.

Next to the crude animistic beliefs of the primitive hill peoples, who see gods in rocks and trees, Hinduism is the oldest religion, and includes in its numerous sects more than 200 million persons. Hinduism has many forms, all marked by a belief in many gods, in

THE UNTAMED AFGHANS



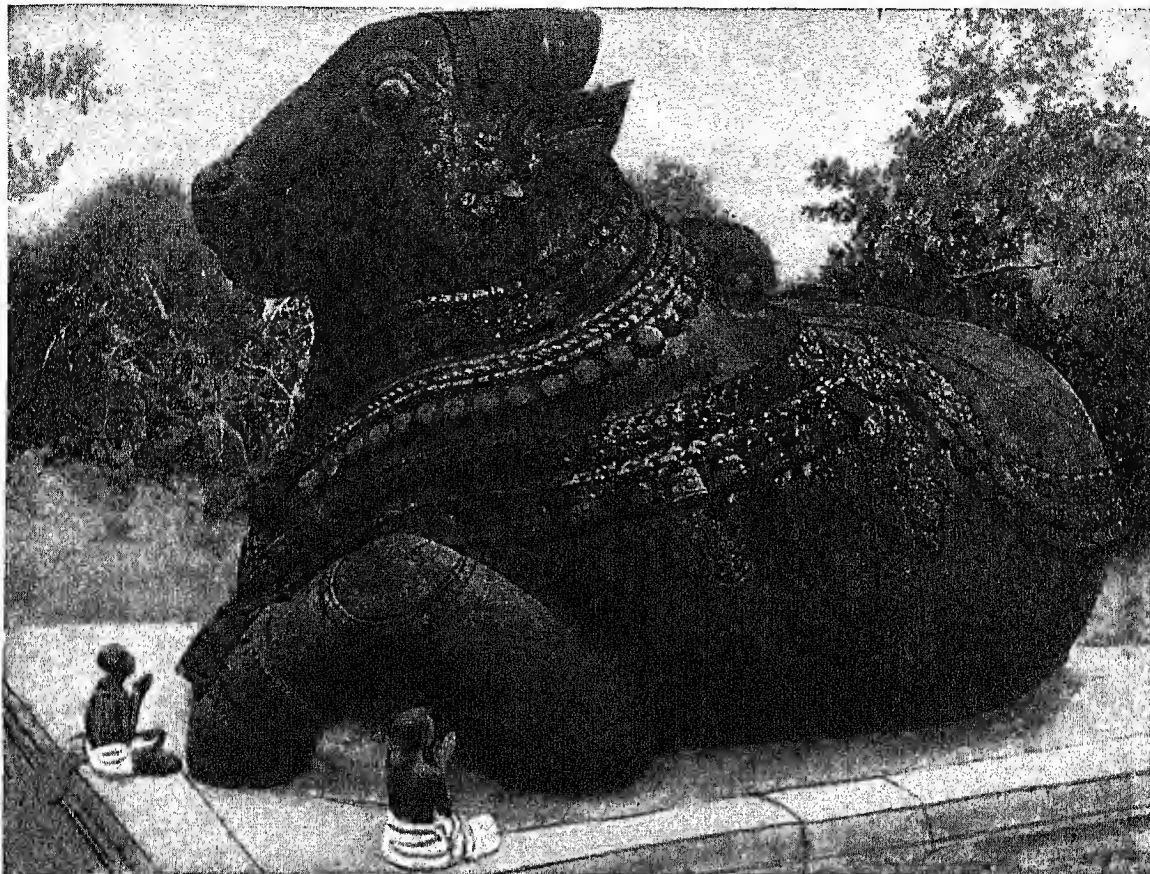
These two chiefs belong to the border tribes of Afghanistan. These tribes are composed for the most part of haughty and fierce barbarians, ever ready to fight for their independence or simply to "fight for fun."



A MARK OF RESPECT

When meeting an elderly male relative, a Toda woman of the Nilgiri hill tribes kneels or bows and places her head beneath his foot, which she supports with her hand. Thus she expresses the general opinion of Nilgiri society that men are the lords of creation.

THE GIANT BULL OF SIVA WITH THE HAUGHTY AIR



This immense figure carved from stone stands near the city of Mysore. See that look of calm disdain on his face, while the two Hindus kneel before him in prayer! That's because he is a representative of the god Siva, and because under that great left hoof rests the fate of many a poor worshiper, or at least so they believe.

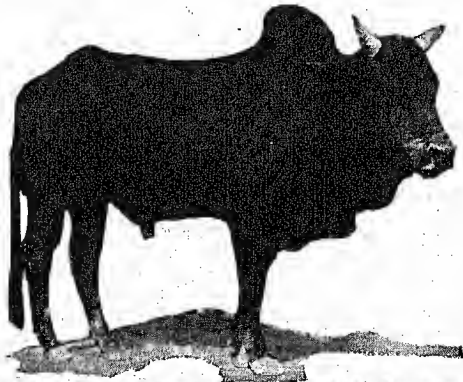
universal reincarnation, and by accepting the supremacy of the Brahmins and the restrictions of the caste system (*see* Hinduism). The Sikhs form a religious community, centering in the Punjab, whose history dates back to the 16th century. Their faith is a curious mixture of Mohammedanism and Hinduism, and for a time they constituted a military brotherhood of formidable power. Today they number little more than four millions. The Jains, on the other hand, tend to combine the Buddhist and Hindu religions. There are today about 1,250,000 Jains, scattered through Hindustan and westward in Gujarat, and among them are many of the richest and most influential of Indian merchants. Their temples, among which are the famous ones on Mount Abu,

are the finest in all India. The Parsees are descendants of Persian Zoroastrians—fire and sun worshipers who fled to India to escape the Mohammedan massacres of the 7th century. Centering about Bombay,

they form now a rich merchant class of great power, despite the fact that their total number is only 100,000.

The native Christians of India number about six millions, with the Roman Catholics far in the lead. The Mohammedans, with about 78 millions, form the largest religious group next to the followers of Hinduism (*see* Mohammed). The Buddhists, once exceedingly powerful in the land, have virtually disappeared from India proper; of the 13,000,000 counted in the empire today, all but about 300,000 are found in Burma (*see* Buddha).

THE STONE BULL'S LIVING BROTHER



Indian cattle are peculiar for the fleshy hump on their backs and the great fold of skin under their necks. While very humble looking, compared to Siva's stone bull above, they nevertheless receive a big share of Hindu reverence.

A CURIOUS WAY TO CURE THE TOOTHACHE



If you were a native boy of India and got the toothache, your parents might first call a native doctor; then, if you didn't get better, a soothsayer, who would call in the devil dancers, and the devil dancers would bring with them the tom-tom players, such as those in this picture, to beat time while they propitiated the "Toothache Devil." The dancers would first put on masks representing the way one looks when he has the toothache and later masks showing the face of a mild inoffensive person, to represent the Toothache Devil in a good humor; as much as to say to him in sign language, "We know you are causing this trouble, but after all you are a decent fellow, and kindly don't hurt this little boy any more." Curiously enough these ceremonies usually have a favorable effect on the patient—just because he thinks they will, no doubt.

The followers of Hinduism, which means at least two-thirds of the population, are grouped into countless castes which are half social, half religious. The caste system had its foundation in the old Aryan law, which divided the people into four classes—the priests or Brahmans, the warriors or Kshatriyas, the farmers or Vaisyas, and the laborers or Sudras. The latter consisted of the conquered non-Aryan peoples.

Today these four original castes have been subdivided again and again until it is impossible to tell the number. Estimates vary between 2,000 and 3,000 distinct groups. The divisions are made upon a basis of race, geographical situation, and occupation. Thus five classes or "nations" of Brahmans dwell south of the Vindhya Mountains and five to the north; and these ten are in turn split in no less than 1,886 tribes.

AN UPTURNED SAINT



Dressed in rags and suspending themselves like this for long periods of time, the "Saints with the Uprturned Face" get a great reputation for sanctity. They are only one of the many classes of "fakirs" or holy men among the Hindus who inflict painful penances upon themselves.

The members of each handicraft, such as potters, jewelers, etc., tend to form separate castes which amount to trade guilds or unions.

The restrictions which surround members of a caste are innumerable. Generally speaking a person may not marry outside his caste, nor may he touch or associate with a member of a lower caste. Certain of the high-caste Hindus feel that they are profaned if even the shadow of a European or of the member of a lower caste falls upon them or their food or anything which belongs to them, and that they must thereupon perform elaborate rites of purification.

Lower yet than the Sudras are the outcastes and other "depressed classes"—some 60,000,000 people. Most of these are regarded as "untouchables" and are barred from using the public roads, bridges, and temples. They are forced to

live outside the villages and are allowed to enter only such despised occupations as street-sweeping and leather-working. So defiling is their touch that most Hindus would rather die than accept their help, and they are not even allowed to draw water from the public well.

The average Hindu is a peaceful, patient person. "Life in India," says one writer, "is regarded in a very serious spirit by which even the children are subdued. You will never see them romping at play, and their games are of the quietest description. They take no pleasure whatever in teas-

ing animals, and the birds and beasts of the household are extraordinarily tame. They are not so much petted as treated with the consideration due to members of the family; the cultivator appeals to his bullocks as 'my brothers.' To adults life offers few pleasures. Eating is a monotonous experience of the plainest dishes. Drinking, for the respectable, is limited to water. There are no attractions in sport or in physical exercises. Fairs and festivals give some excitement to the women who can attend them; but the men derive their pleasure rather from the gratification of a sense of dignity and importance than from the exercise of the functions of mind or body."

The position of Indian women is not enviable. They are usually not permitted to learn to read and write, but are closely confined to their homes, where they perform all the menial tasks. They are not even permitted to sit down to meals with their husbands, but must serve them in silence and take what they leave. In spite of legislation, infant and child marriages are common. Although the practice of *suttee*, which allowed a Hindu widow to burn herself on the pyre of her husband, has been stamped out, the lot of a widow is pitiable. She must

keep her head shaved, give away all her jewels, and usually spend the rest of her life performing the most menial labor for the family of the dead husband.

The caravans which slowly tread their way through

the passes of Afghanistan are following one of the oldest trade routes in the world. At the dawn of history India was already famous for its wealth, its gold and silver and precious stones, its fine silks, its spices and drugs and rare woods. Treasures from India reached the ancient courts of Assyria and Egypt.

Today India's

wealth is not

reckoned in gold or precious stones, but in the products of the fields. Agriculture is the most important industry, 230,000,000 of the population, out of a total of 350,000,000, making their living by farming, forestry, and stock-raising. And with the increased development of irrigation and transportation facilities, the industry is growing rapidly.

Rice is the chief crop and the staple food of most

of the people. In the drier regions, where fields cannot be flooded for the growing of rice, millet and wheat are the chief food crops. Pulses (beans, peas, and the other legumes) are also widely grown. Various oil-seeds and oil-producing plants, such as linseed, rape, mustard, sesamum, groundnuts, castor plants, etc., are extensively grown, for the natives use vast quantities of oil for cooking, for their primitive lamps, and for anointing themselves, and many of these oils are exported. Jute and cotton are India's most valuable products (see Jute; Cotton). Other important crops are barley, sugar cane, indigo, tea, coconuts, tobacco, and poppies for the production of opium.

It is estimated that there are more cattle in India than in any other part of the world, but they are a hump-backed species of

WHERE DANCING IS A RELIGION



This is one of the "Nautch" dancers connected with the temples in India, who are known as servants of the gods, because they dance and sing before the idols. They also dance at banquets, marriages, and public entertainments. Notice the jewel the girl wears in her right nostril.

WATER CARRIERS



In many regions where water is scarce, it is carried from house to house in sheepskins and sold to the housewives. The water carriers form one of the lowest castes.

inferior quality, and since the religion of the great majority of Hindus forbids eating beef, the animals are used chiefly for draft purposes. Half-tamed buffaloes are also used in many sections for farm

ONE OF THE RAJPUTS



This is a Rajput, a member of the fighting and ruling caste of India. The Rajputs are usually of fine appearance, and exceedingly proud of their ancestry. They make some of the finest soldiers in the Indian army.

labor, and in the northwest camels are the principal work animals.

Among the most important manufacturing establishments of India are cotton mills, jute mills, and sugar mills. Coal, gold, and petroleum are the leading mineral products. Railway development has proceeded further in India than in any other part of Asia. About 40,000 miles are now in operation, consisting of broad gauge trunk lines connecting the large centers of population, and a network of narrow gauge lines. The rivers and canals carry much inland traffic.

India's Tangled History

The early history of India is mostly lost in the mists of ancient traditions. The great Hindu epic poem 'Rig-Veda', written about 1500 B.C., tells of the old struggle between the Aryan invaders and the "black people" who were in possession of the soil. By the 6th century B.C., 16 Aryan states had been established south of the Himalayas, and Brahmanism was flourishing. In 327 B.C. the armies of Alexander the Great reached the Hydaspes River (the modern Jhelam in the Punjab) and the Greek settlements he left behind made a profound impression upon the

art and literature of the country. The next 13 centuries were marked by a succession of bitter struggles for power between Indian princes, and by a succession of invasions, among which stand out the inroads of the

White Huns in the 5th and 6th centuries A.D. The first attacks of the Mohammedans were repelled, but in the 11th century the Turkish leader Mahmud established the Ghazni dynasty in the land. The Mongol invasion of Genghis Khan followed in 1219 and in 1397 Tamerlane's Tatar hordes poured into India (see Mongols). In 1526, Baber, who was a descendant of Genghis Khan as well as Tamerlane, came through the northwest passes from Afghanistan and seized the throne at Delhi, establishing the great Mogul empire

AMONG INDIA'S BEST CITIZENS



These two Bombay merchants are Parsees, descendants of Persian "fire worshipers" who fled to India in the 7th century. The Parsees, who hold themselves aloof from the Hindus, are among the most respected and prosperous people of the land.

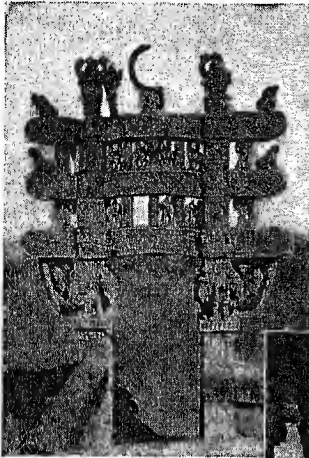
A BRAHMAN AND HIS BEADS



The Brahmins form the priestly caste. This one wears a coat and head-dress of holy beads, and carries his "caste mark" on his forehead. Ranking even above the Rajputs, the Brahmins guard their privileges jealously.

which remained intact until the close of the 18th century. The south of India was never completely conquered, but the empire of the north, under such rulers as Akbar and Shah Jehan, was perhaps the most brilliant in the history of the Orient. During the reign of Aurungzebe (1618-1707), the last of the "Great Moguls," arose the power of the Mahrattas in the south, which so undermined the Mogul rule that its last years present a picture of weakness and decay.

Meanwhile the struggle between Europeans for supremacy in Indian affairs had begun. With Vasco da Gama's discovery of the ocean route around the Cape of Good Hope in 1498 there began a race for the rich Indian trade between Portugal, Holland, and France. In 1600 the English East India Company joined in the rivalry, and soon had trading posts at Madras, Bombay, and Calcutta



INDIAN ART

On the left is the famous carved gate at Bhilsa. It dates back many centuries before the Christian Era, and is considered one of the finest specimens of Buddhist art. This gateway stands at one of the four entrances of the Sanchi Stupa, the oldest historical ruin in India. The second picture shows the carved pillars in a temple at Delhi. Such elaborate carving is typical of Hindu art.



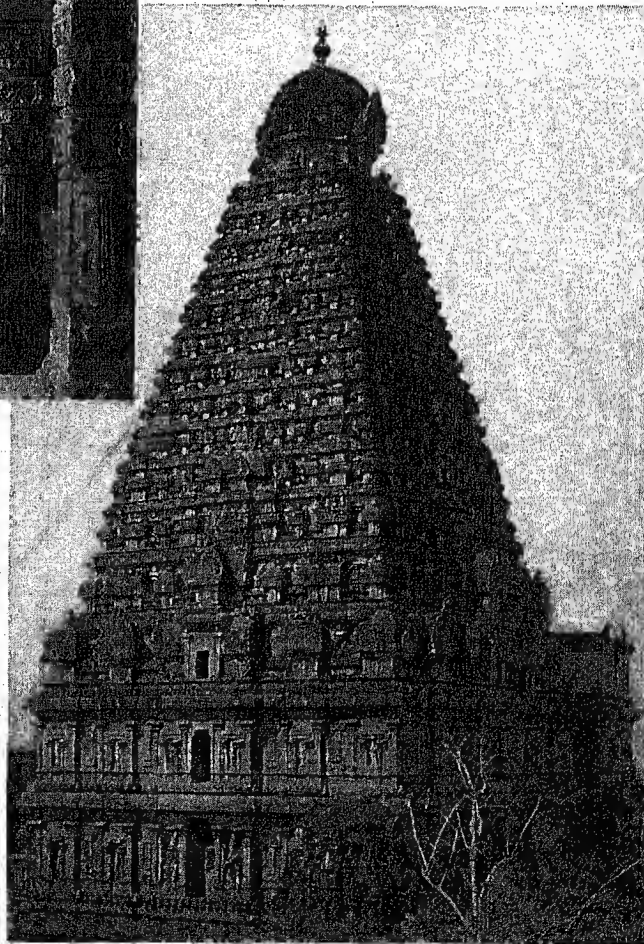
(then called Fort William). The history of India from that time forward deals chiefly with the long commercial struggles of these European rivals. The French, under the leadership of a brilliant governor, Joseph Dupleix, enlisted and drilled native troops and with these interfered so successfully in native quarrels that by 1751 the Carnatic and the Deccan were under French influence.

Just as British influence was threatened with extinction in India, the genius of Robert Clive turned the tables. His storming and successful holding of Arcot in 1751 and then his victory at Plassey in 1757 overthrew the French power and laid the foundations of the rule of the English East India Company (see Clive, Robert). Later mere trading rights gradually grew into political rule. It was one of the strangest conquests in history, this by which a private trading company conquered an empire by the use chiefly of soldiers (Sepoys) raised in that land itself.

Warren Hastings, who became governor-general for the East India Company in 1774, built soundly upon the foundation Clive had laid. He subdued the Mahratta princes and crushed the famous Hyder Ali, sultan of Mysore (see Hastings, Warren). In the next 30 years the rule of the British Company extended over a great part of India. Between 1848 and 1856 the Sikhs were defeated and the Punjab was annexed.

But certain high-handed methods employed by the British Company, together with the teachings of missionaries and the advance of European customs, had stirred a great wave of unrest. In 1857 a rumor was circulated among the native troops enlisted under the British flag that the cartridge papers, which the soldiers must tear with their teeth, were greased with the fat of cows and pigs—the former held sacred by the Hindus, and the latter abhorred by the Mohomedans. This rumor set fire to the tinder of discontent, and the great Indian Mutiny of 1857 was the result. The insurrection spread rapidly in the north.

Nana Sahib, a Mahratta prince, besieged a British force in Cawnpore, and, after promising safe-conduct, treacherously massacred his prisoners, including women and children. Another British force was besieged in Lucknow, but after the commander, Sir Henry Lawrence, and many others had been killed, the survivors were rescued. Not until Delhi was captured in September, was the mutiny broken.



The great Pagoda at Tanjore, in the Province of Madras, is 200 feet high and is one of the most striking examples of temple architecture in India. Thousands of sculptured figures cover its walls.

This tragic outbreak ended the power of the East India Company. In 1858 the administration was transferred from the company to the British crown.

How India is Governed

The constitution of 1935 provides for the federation of the 11 autonomous provinces of British India and the native Indian states. Burma is not included in the federation but has a separate government (*see* Burma). The chief executive of India is the governor-general, known as the viceroy, appointed by the British government. He is assisted by an advisory Council of Ministers, responsible to the Federal Legislature. The Legislature consists of two chambers. The members are chosen chiefly by the provincial legislatures and by the rulers of the native states, a small number being appointed directly by the governor-general. Each province has a local governor and a legislature chosen by vote of 14 per cent of the population. The native states are ruled by native princes, but are subject in certain respects to the British government.

The Struggle for Home Rule

British domination has never been wholly accepted by the people, and the political air has always been tense with mutiny. British rule has brought factories, railroads, hospitals, police systems, Western courts, modernized cities, schools and universities, and brisk trade. But, to quote the Earl of Ronaldshay, "the organization of industries on the lines evolved by Western nations is something which is altogether alien to the genius of the Indian people." The conflict between the two races was greatly intensified after the first World War. During the war, India sent money and men to the aid of Britain. These men returned with a new sense of the importance of India to the Empire, and demanded a larger share in the government. The Act of 1919 promised it to them. India signed the peace treaty and was made an independent member of the League of Nations. But the Indians had expected freedom, or at least home rule. Smoldering discontent became open revolt.

Gandhi and Swaraj

In a rebellion against foreign domination and Western civilization, the strange ascetic, Mohandas Gandhi, squatting in his white robe before a spinning wheel, initiated the Swaraj, or Home Rule, movement (*see* Gandhi). He urged passive resistance, and tried to end the cruel caste system, and the wasteful hate between Mohammedans and Hindus, so that India might present a united front against everything British—government, imports, machinery, philosophy. But another faction of Swaraj, led by Chitta Ranjan Das, urged violence. A British general yielded to panic and in 1919 brutally killed 400 unarmed Hindus in the "Amritsar massacre," which greatly strengthened the Das faction. In 1922 Gandhi was sentenced to prison for sedition, and although he was released in 1924, his imprisonment increased Indian resistance and his own popularity.

At the same time communism was gaining, and the country was more and more torn by the religious feuds

between Hindus and Moslems. These riots became more frequent in 1926. Conditions were so bad that Britain had either to face a crisis in which it might easily be loser, or grant India a larger measure of self-rule. In accordance with the Act of 1919 the government of 1927 appointed a commission with Sir John Simon as chairman to inquire into the advisability of altering the constitution, and to investigate all phases of the government of British India. But there were no Indian representatives on this commission, and Indian Nationalists were enraged. Opposition of the Indian National Congress increased, and the civil disobedience campaign, or passive resistance, continued with greater intensity than ever.

All during 1929 Indian Nationalism grew in ardor. In March 1930 Gandhi demanded immediate dominion status for India, and when it was not granted, he inaugurated his "Salt Rebellion," attacking the government monopoly on salt as typifying what his followers felt to be unjust oppression. As before, he stressed his policy of non-violence, but without avail. Rioting broke out afresh and Gandhi and his associates in the campaign were imprisoned.

London Round-Table Conference Fails

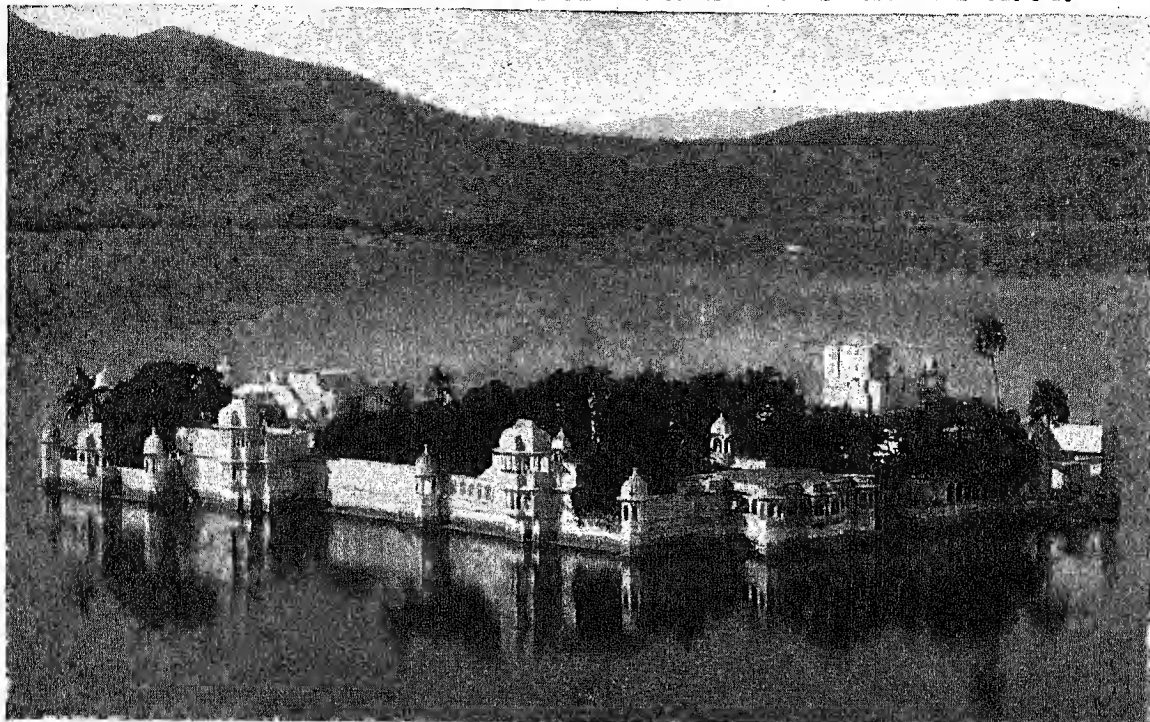
The report of the Simon Commission, made public in June 1930, outlined a new constitutional organization for British India on the basis of a federation of autonomous provinces. With the exception of Burma, which was to develop separately towards self-government, all the provinces were included in this proposed system. A "round-table conference" of British and Indian leaders to consider the details of such a scheme met in London in November 1930, but the Indian Nationalists refused to participate.

In 1931 the Indian National Congress agreed to discontinue the passive resistance campaign and Gandhi himself headed an Indian delegation to the second round-table conference in London. The breakdown of negotiations provoked a new civil disobedience campaign. Nevertheless, a third round-table conference was held in 1932, and a final draft of the new constitution was adopted. In 1935 the British Parliament accepted the constitution as the Government of India Act, and, despite the protests of the Nationalists, it was put into effect in 1937.

India at War with Germany

Under the new constitution, Great Britain retained absolute control of India's foreign policy and defense. When Britain went to war against Germany in September 1939, the British viceroy, Lord Linlithgow, announced India's entry. Some leaders and princes of the native states pledged their support, but the Indian National Congress demanded immediate independence as the price of its assistance. The British government offered instead dominion status after the war. The National Congress party replied in August 1942 by calling once more for a campaign of civil disobedience. Riots broke out and the British intent on preventing the spread of disorder arrested Gandhi, Jawaharlal Nehru, and other party leaders.

LIKE A CLUSTER OF PEARLS ON A CRYSTAL MIRROR



This is one of two beautiful palaces erected on islands in Lake Pichola in the native state of Udaipur. The island is completely inclosed within the marble walls of the palace. It is four acres in extent and, besides the palace buildings, contains three gardens divided from one another by arcaded cloisters in which grow oranges and other tropical fruits.

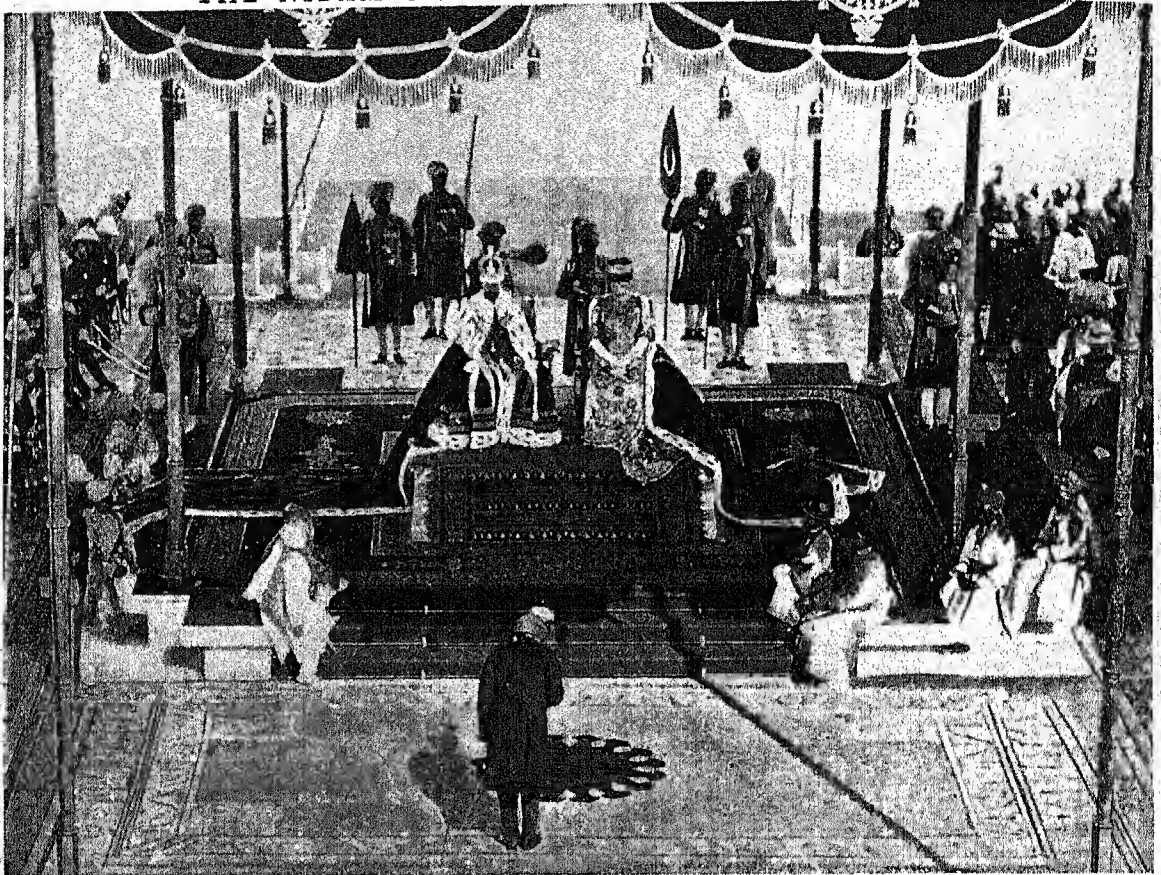
Architecture is the chief art of India and it has always been distinguished by the same highly decorative style which gives such unique beauty to Indian metal work, jewelry, pottery, and textile patterns. Because most of the early Hindu buildings were of wood and clay, India contains no such relics of ancient architecture as have been left to us in Egypt and Greece, and indeed it is doubtful whether the early Brahman faith encouraged the building of temples. But with the advent of Buddhism and Jainism, monasteries and shrines sprang up over the land. When to these early styles Mohammedan influences were added from the 11th century onward, India developed a varied art of building which gave to the world some of the most beautiful structures in existence. The distinctive feature of Indian architecture is the delicacy and elaborateness of its detail. Some of the temples are covered with mazes of carved figures in unbelievable profusion. Many of the shrines are cut out bodily from the rock, such as the famous underground temples on the island of Elephanta in Bombay harbor. For sheer elegance and grace nothing can compare, however, to the buildings put up by the Great Moguls, such as the world famous Taj Mahal (*see* Taj Mahal), and those erected by their Rajput rivals, including the noted palaces built on the islands of Lake Pichola in Udaipur.

Hindu painting, occupied as it has always been with a grotesque religious imagery, makes no pro-

found appeal to Western eyes. Sculpture suffers from the same fault, and while many of the "pagan gods" are impressive by their size and ornamentation, they cannot be called truly artistic. Much more fascinating is the work of the Indian craftsmen, such as the enameling done by the Sikhs and the damascening of metal objects in gold and silver wire, which is practiced in Cashmere, in the Punjab, and in the state of Hyderabad.

The earliest Hindu literature consists of the Vedic hymns, of which the 'Rig-Veda' is the most ancient collection. This consists of 1,017 short poems, mostly addressed to the gods, but giving a definite picture of a high civilization existing about the time the Aryan invaders had reached the banks of the Indus and were fighting the "dark people" to the south. To the Vedic poems were attached prose works called 'Brahmanas', explaining the duties of the priests; then were added the 'Sutras', telling of laws and ceremonies; and later the 'Upanishads', treating of God and the soul; the 'Aranyakas', giving directions for leading a holy life; and finally the 'Puras' or sacred traditions. The two most famous historical poems are the 'Mahabharata' or chronicles of the Delhi kings, and the 'Ramayana' or story of the Aryan advance into southern India. During the period from the 1st to the 8th century A.D. were composed a number of Sanskrit epics and dramas filled with adventure and romance. The old Hindu fables

THE NIZAM OF HYDERABAD PAYING HOMAGE



Seated on the throne erected for the ceremonial at the great Durbar or royal reception at Delhi in 1911 are George V and Mary, King and Queen of Great Britain and Emperor and Empress of India. A part of the impressive ceremonies was the acknowledgment of the sovereignty of Great Britain over India by the rulers of the native states, who in succession passed before Their Majesties and paid them formal homage, as the Nizam of Hyderabad is doing here.

of animals, which were translated into the Persian as early as the 6th century A.D. and so found their way into Europe, are said to be the basis for many of the nursery stories of England and America.

Literature of Modern India

Under the influence of modern education a new vernacular literature has been developing in India. In the Bengali language is a wealth of literature of high rank combining European ideas with Hindu idealism. In the 19th century the novelist Bankim Chandra Chatterji (1838-1894), whose fiction was written after the European manner, exerted a wide influence on younger writers. Most distinguished of these was Sir Rabindranath Tagore (1861-1941). Tagore's poems, parables, dramas, and tales are revered the world over for their beauty and simplicity. In 1913 he was awarded the Nobel prize for literature, and in 1915 he received the honor of knighthood from the British Crown. Among his well-known works are 'The Crescent Moon: Child Poems', 'The Gardener', and 'Gora', a novel.

Indian music is peculiar to Western ears in that it contains no harmony. It is made up of melody and

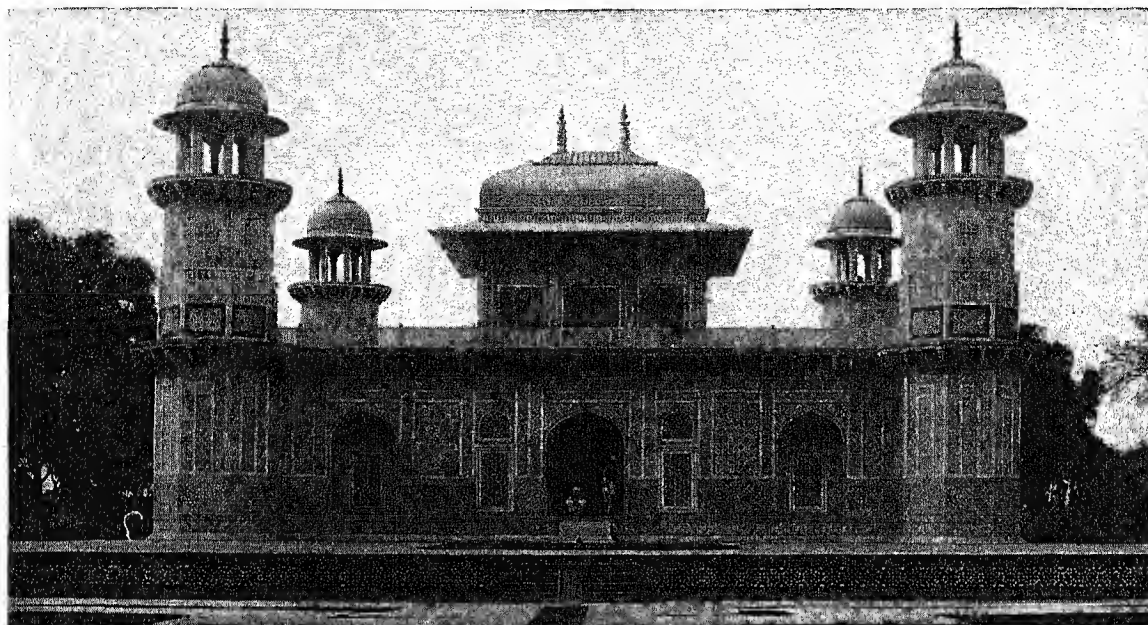
rhythm only. There is no accompaniment to the melody as in Western music. No two different tones are sounded at the same time. Several instruments are rarely used together, and when they are, they play in unison. Songs, which are of the greatest importance in Indian life, are sung in unison also. Among instruments, drums and flutes are important. There are also stringed instruments, some of ancient origin.

Centuries of Scientific Endeavor

In recent years India has seen a great revival of interest in science. Centuries ago Hindu astronomers and mathematicians were highly honored and contributed an important share to the development of knowledge. They exchanged ideas with the Greeks at the time of Alexander's conquest, and in the 9th century important Hindu scientific works were translated by the Arabs and so reached Europe.

Primary education in India has made only small progress despite all efforts. Of the women, only about one per cent can read and write. Instruction in the primary schools is in the vernacular languages. The secondary schools are divided into vernacular and English schools, and into high and middle

A TOMB AS BEAUTIFUL AS A JEWELLED CROWN



The tomb of Itimad-ud-daula at Agra is one of the most magnificent pieces of architecture in the world. It was built in 1628 by Nur Jehan for her father, a Persian refugee. The exterior is of glistening white marble, carved and inlaid with delicate designs. Raised upon a decorated platform in the midst of a beautiful garden, it overlooks the city of Agra—a reminder of India's great past.

groups. Above these are the intermediate colleges and the colleges, the latter supervised by eight federal universities. The oldest of these are at Calcutta, Madras, and Bombay, all founded in 1857. The other five are at Punjab (1882), Patna (1917), Nagpur (1923), Andhra (1926), and Agra (1927). At Allahabad, Rangoon, Lucknow, Dacca, Annamalai, and Delhi, there are teaching and residential universities. There is a Hindu university at Benares, and a Mohammedan university at Aligarh.

Islands; Possessions of France and Portugal

The Andaman and Nicobar islands in the Bay of Bengal are also under the Indian administration. The former

group, consisting of the Little and the Great Andamans, divided by the Duncan Passage, with a total area of 2,508 square miles, has been used as a penal colony. The natives of these islands are of negrito race and of great interest to scientists. The Nicobar group consists of 19 islands, 12 of which are inhabited. The total area is 635 square miles.

The French, who were once supreme in India, retain the following five colonies: Pondichéry, Karikal, and Yanam on the Coromandel Coast; Mahé on the Malabar Coast, and Chandernagor in Bengal. These possessions, with a total area of 196 square miles, are administered by a governor residing at Pondichéry. The Portuguese retain a small area on the Malabar Coast called Goa, the seaport of Damão, 100 miles north of Bombay, and the island of Diu on the other side of the Gulf of Cambay. Portuguese India has an area of about 1,460 square miles.

—REFERENCE-OUTLINE for INDIA, BURMA, and AFGHANISTAN—

INDIA is the home of a population almost as great as China's and of a civilization more ancient than that of Europe. The difficulties which the British encounter in ruling its people grow out of conflicting religious beliefs and the poverty of the masses. Burma, formerly administered as a province of British India, is since 1937 under separate rule. Afghanistan, a buffer state between India, Iran, and the Soviet Union, is also controlled by Great Britain.

India

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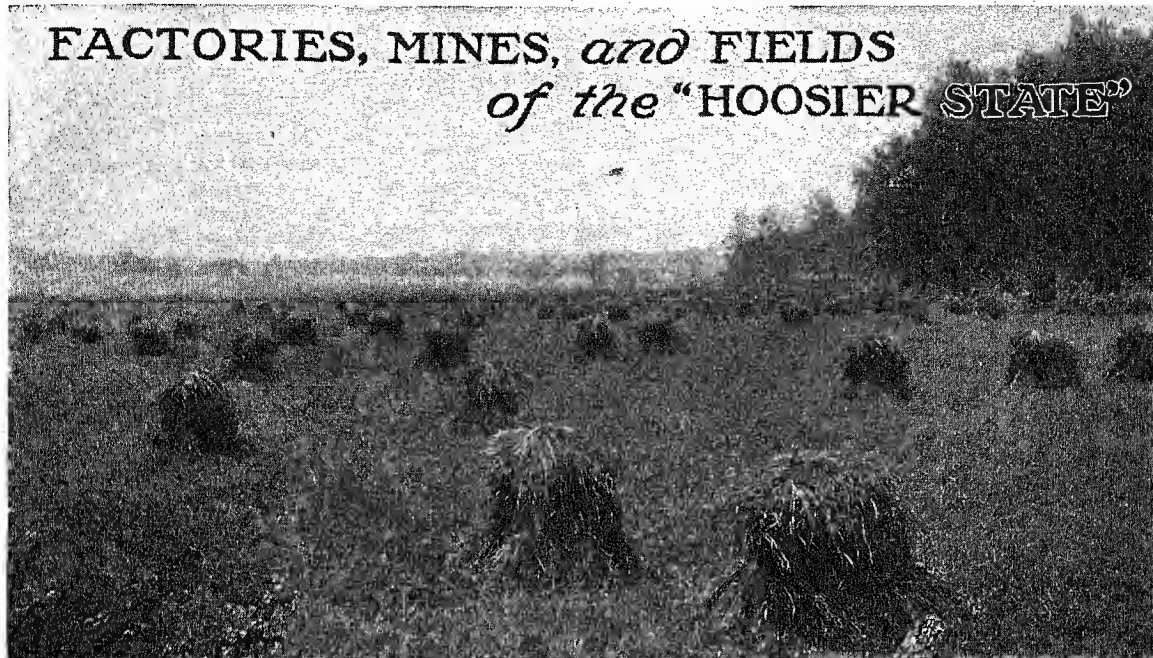
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FACTORIES, MINES, *and* FIELDS of the "HOOSIER STATE"



INDIANA. The name "Indiana," which means "Indian land," is a memorial to the red men who used to roam this region. When Ohio was set off from the original Northwest Territory in 1800, the remainder was called Indiana Territory. It included the present states of Indiana, Illinois, and Wisconsin, as well as the western part of Michigan. In 1805 Michigan was carved off at the north, and in 1809 the territory of Illinois (including Wisconsin) was separated on the west. Thus Indiana acquired its present shape and size.

If we could get high enough in an airplane to view the entire state in summer, we should see a level green expanse, mottled with brown plowed lands and fields of ripening grain. We should see silver rivers and, in the northern portion, many jewel-like lakes created ages ago by the glaciers which covered the greater part of the state. As a whole the state would seem almost monotonously level. From the highest part, which rises to an average height of about 1,000 feet along the center of the Ohio border, the land slopes gently to 585 feet above sea level on its northwest margin, along Lake Michigan. The slope to the southwest is somewhat sharper; the lowest point, 313 feet above sea level, is where the Wabash enters the Ohio, near the southwest corner. Water covers only 86 square miles of the state.

The northeast corner of the state drains into Lake Erie. Elsewhere the state slopes south and west;

Extent.—North to south, 276 miles; east to west, 177 miles. Area, 36,291 square miles. Population (1940 census), 3,427,796.

Natural Features.—Rolling country with numerous small lakes in the north, hills and low broken ridges and knobs in the south (highest point, 1,240 feet, in Randolph County, 60 miles northeast of Indianapolis). Sand dunes along Lake Michigan in the northwest. Wyandotte Cave in Crawford County. Principal rivers: Ohio, Wabash, White, Kankakee, Maumee, and St. Joseph. Mean annual temperature, 53°; mean annual precipitation, 39".

Products.—Corn, wheat, oats, hay, tobacco, soy beans; cattle and dairy products, hogs, sheep and wool, poultry and eggs; coal, limestone, clay, cement; iron and steel products, automobiles and parts, foundry products, machinery, railroad cars, furniture, coke, chemicals, glass, clothing, flour and mill products, meat packing, other food products.

Cities.—Indianapolis (capital, 386,972), Fort Wayne (118,410), Gary (111,719), South Bend (101,268), Evansville (97,062), Hammond (70,184), Terre Haute (62,693), East Chicago (54,637), Muncie (49,720), Anderson (41,572).

so most of the rivers drain through the Wabash into the Ohio.

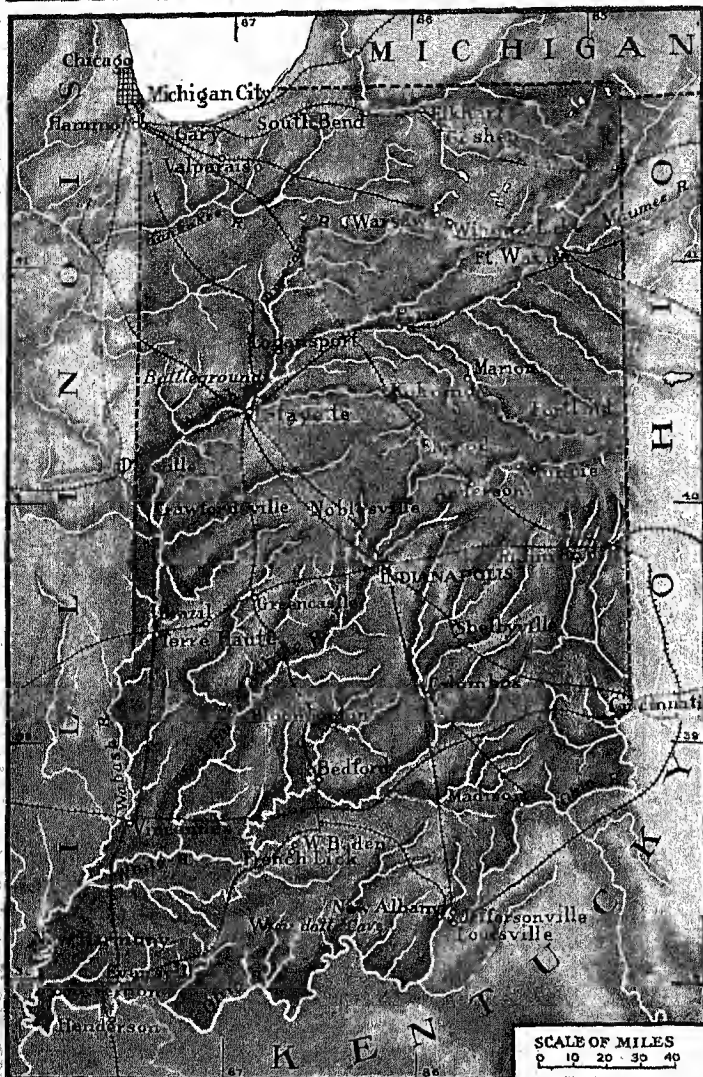
Along the shore of Lake Michigan, wind-blown sand dunes rise in places to a height of 400 feet. Some of the dunes are barren and desert-like. Others are covered with binder grass, cottonwood, scraggy pines, and oak.

More than 2,000 acres in this region, purchased in 1925, are preserved wild as Indiana Dunes State Park.

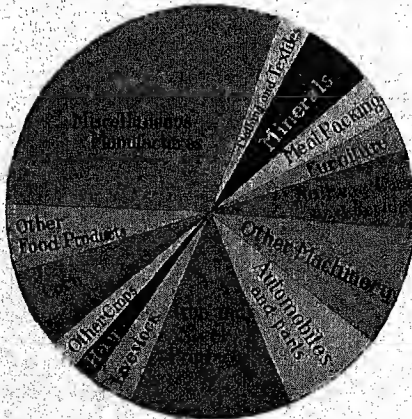
The southern half of the state is less regular. In the middle it rises to a broken highland cut by ages of weathering into beautiful valleys. In this region, south of Indianapolis, lies picturesque Brown County, beloved by artists. Southward from near Columbus to New Albany on the Ohio River, runs a range of rocky hills. This is called the "Knobstone Escarpment." West of this formation lies relatively level limestone land. The region is riddled with caverns and "lost rivers" that plunge from their surface beds into sink-holes and are lost to sight.

The glaciers which scoured the greater part of Indiana left clay and limy drift. Great forests later enriched this material with humus, and did the same for the limestone soil farther south. The result is an exceedingly fertile soil, 200 feet deep in places.

To these gifts of level land and rich soil, nature added a favorable climate, making Indiana an ideal region for the farmer. An annual rainfall of 40 inches gives plenty of moisture for crops. An average temperature of 31 degrees in winter rests the soil



The State of Indiana occupies the heart of what is, in many respects, the most prosperous portion of the whole United States. Notice how it was planned, with Indianapolis, its capital, in the exact center of the rolling plains, which are today rich farm lands.



without being harsh; the summer average of 76 is good for plant growth without being oppressive. So Indiana ranks among the leading states in the value of farm output, though it is 37th in area.

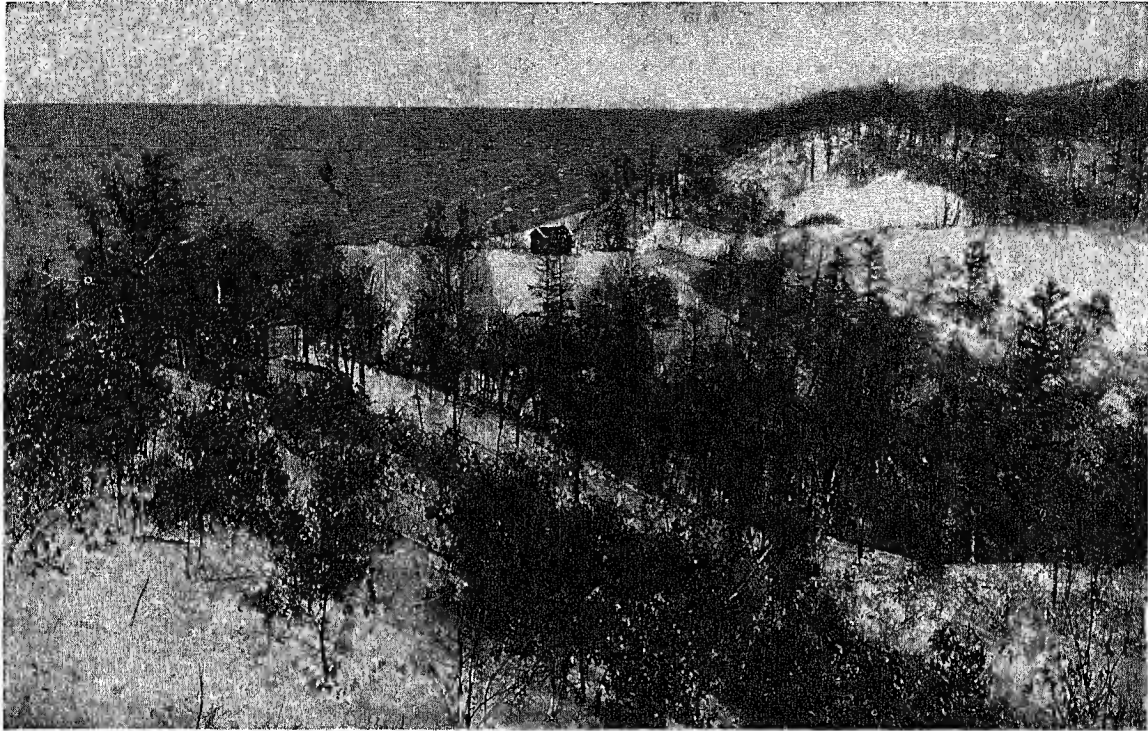
The foundation of Indiana's wealth is the corn crop, and the animals raised on corn. The value of this crop may be judged from the fact that though Indiana ranks near the bottom of the second dozen states in value of crops, it consistently heads this group in total farm income. The gain is made partly in cattle, both of beef and dairy breeds; but the great animal "crop" is hogs. Indiana ranks among the first half-dozen states in the Union as a hog producer.

In wheat growing, Indiana takes place among the first twelve states, since its climate is well suited to winter wheat. Oats, potatoes, and hay are other important crops. North of Indianapolis is a famous tomato-growing section. Minor but important crops are onions and mint in the northern muck lands, apples and peaches in the south-central part, cantelopes and watermelons in the southwest corner, and tobacco in some of the Ohio River counties. Horses and poultry are also important sources of farm revenue.

Most Indiana farmers are American-born of native white parentage. There is little tendency toward large-scale agriculture; the average size of a Hoosier farm is about 100 acres.

Indiana's rivers, flowing through history—"with a strange tumult of battles, treaties, treacheries, massacres, gradually softening down to the sweet murmurs of peace"—meant much in early days. The Wabash River system drains most of the state. The Ohio drains the southern border. The northern part is drained into Lake Erie through the Maumee, into Lake Michigan through the St. Joseph, and into the Illinois River and the Mississippi through the Kankakee. All these streams floated the canoes of the French trappers, fur traders, and Jesuit missionaries in the 18th century. The Ohio and its tributaries largely determined the course of the first immigration from Virginia, Kentucky, and the Carolinas, by which the southern portion of the state was settled in the late 18th and early 19th centuries. Many a pleasant, quiet stream was reddened in those early days by border battles now half-forgotten; only the name of the Tippecanoe, where the Shawnee Prophet was de-

A PATCH OF WILDERNESS SURROUNDED BY CIVILIZATION



For many miles along the Indiana shore of Lake Michigan stretches a range of sand-hills known as "the Dunes." Immediately back of this range is a prosperous farming country, and it is flanked at both ends by thriving industrial communities, but the dunes themselves are bare of inhabitants, save campers and picnickers. Curiously enough, many forms of semi-tropical vegetation, such as orchids and fly-catching plants, are to be found among these hills.

feated and the splendid dream of his great brother Tecumseh was shattered, remains memorable to this day. The lower Wabash, the lower White, and the Ohio rivers were highways for early commerce; and from 1820 to 1840 nine-tenths of the surplus produce of Indiana was shipped by flatboat down these streams to the Mississippi and to New Orleans. Today the only waterways in use in the state are Lake Michigan and, to a very limited extent, the Ohio River, the lower Wabash, and a small part of the White; nor are the rivers used to any great extent for water-power. The water supply of Indiana streams, variable at best since the destruction of the once great forests, has grown too irregular for profitable use.

No one could guess from the aspect of Indiana today that when the first settlers entered it the greater portion was covered with dense growths of magnificent hardwood trees—oak, walnut, beech, ash, maple, and the king of the Wabash valley, the giant sycamore—in all, more than 40 kinds of trees, which not infrequently reached a height of 100 to 190 feet and a circumference of 25 to 35 feet. It makes one shudder to realize that most of these huge and splendid forest monarchs did not even furnish timber or fuel, or serve any useful purpose. They were simply cut, piled in heaps, and burned with immense labor to clear the land for planting. It could not be

helped. The forest was a barrier to progress, a foe to agriculture, and a refuge for Indians, bears, panthers, wild cats, and lynxes, as well as for deer and other gentler wild creatures.

The stout Hoosier pioneers, snatching at every opportunity to sweeten toil and hardship with fun and frolic, made the "log-rolling" a community festival. The 20 to 50 men of a neighborhood would gather early in the day with axes and handspikes at the home of one of their number, and, divided into opposing squads, would make a game of seeing which side could outdo the other in heaping the logs for burning. In the log cabin their women folk were busy quilting and preparing the feast of venison, roast turkey, fried chicken, hog, hominy, potatoes, hot cornbread, biscuit, and gingerbread, pies, preserves, milk, and cider. In the evening the young people would still have energy left for dancing and games, while a hundred flaring log bonfires lit the sky. Each settler received the same help from his neighbors, so the festivity was repeated many times during the season, usually April or May. The log-rolling was a splendid opportunity for political candidates to ingratiate themselves with the voters; an opportunity, too, for the canny farmer, who, it is said, would sometimes postpone his log-rolling until campaign time in order to profit by the enthusiastic labor of rival candidates. ("Log-rolling," by the

way, still remains in our political vocabulary as a term for barter of political favors and services.)

The energetic pioneers, alas! did their work of clearing all too well. Today most of the standing timber is undesirable second growth, much hillside soil has been washed away, ruining many farms, and the navigable streams have deteriorated.

Though its interests were long chiefly agricultural, Indiana has been developing industrially during the last half-century. Its two chief advantages for manufacture are its situation across the path of east-and-west travel, and touching Lake Michigan, and its extensive native coal supplies. To these two factors mainly it owes the remarkable growth of the industrial towns on the northwest border, known as the Calumet district—Gary, Hammond, East Chicago, and Whiting—which largely share the unrivaled railroad facilities of their big neighbor, Chicago. Gary is the center of Indiana's most important industry, steel manufacture; for here Pennsylvania coke, Indiana and Illinois coal, Indiana limestone, and Lake Superior iron ore are readily assembled (*see* Gary). Other principal products are automobiles, meats and meat products, foundry and machine shop products, railroad cars, furniture, coke, glass, building limestone, and flour.

Where "Mad Anthony" Fought

Indianapolis is a meat-packing and railroad headquarters, as well as the state capital and largest city (*see* Indianapolis). Next in size and importance is Fort Wayne, where the St. Joseph and the St. Mary rivers form the Maumee. Near the close of the 17th century, this was the site of an important French outpost. After the completion of the Wabash and Erie Canal in 1843, the city prospered as a commercial and industrial center. It is named after Gen. Anthony Wayne, who built a fort here in 1794 during the Indian hostilities. Fort Wayne is a railway center and the shipping point of a rich agricultural district. It manufactures oil pumps, tanks, iron and steel, mining machinery, motors, hosiery, pottery products, and electrical refrigerators.

South Bend, named because of its picturesque location on the St. Joseph River where it turns in its course through a wealthy farm, fruit, and dairy country, began as a trading post established in 1823. Adjoining it is Notre Dame, the home of the University of Notre Dame, an internationally famous Roman Catholic seat of learning for men, St. Edward's Hall for boys, and St. Mary's College and Academy for girls. Among South Bend's products are automobiles, wagons, agricultural machinery and implements, watches, sewing machines, electric appliances, radios, toys, and textile goods.

Evansville, in the industrial heart of southern Indiana, was named for one of its founders, Gen. Robert M. Evans. It makes furniture, flour and cereals, gas engines, stoves, plows, bricks, tools, trucks, automobile bodies, refrigerators, wood-working products, and cigars. Evansville College was established here in 1910. Terre Haute, on the Wabash,

whose name means "high land," is made prosperous by near-by coal fields and good railway service. Here Fort Harrison was built in 1810. Muncie, on the White River, was once the home of the Munsee, a tribe of Delaware Indians. It is notable for its fine residential districts and the variety of its industries. Anderson is also on the White River, in the center of a rich agricultural district.

Natural gas, discovered in northeastern Indiana in 1885 and later in other sections, did much to develop the industries of Anderson, Elwood, Fort Wayne, Muncie, and other towns. When this cheap fuel supply diminished, soft coal from the southwestern part of the state took its place. There are about 40,000,000,000 tons of Indiana coal reserves. Petroleum in commercial quantities was discovered in the Indiana portion of the Lima-Indiana field a few years after natural gas. Oil production has dwindled, and the great refineries at Whiting, East Chicago, and Hammond now operate chiefly on oil carried in by pipelines from the Mid-Continent field.

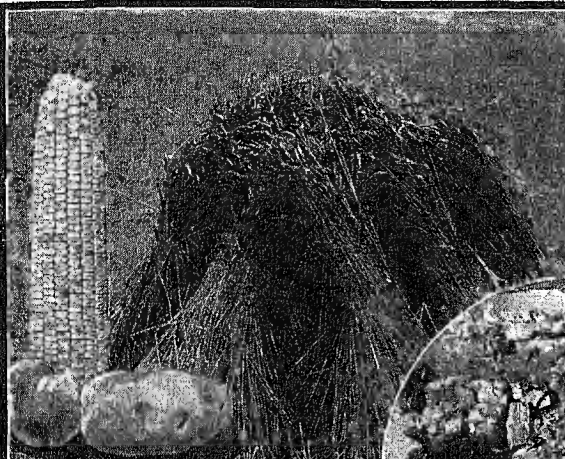
Among other native mineral products used in Indiana manufactures are marl and clay, used particularly in making portland cement, an industry in which the state ranks high; building, foundry, and glass sands, the last named used at Muncie, Kokomo, Terre Haute, and elsewhere in glass manufacture; kaolin and other clays and shales, used at Terre Haute in pottery, and limestone, used both for making lime and for building stone. The oolitic stone known as Bedford or Indiana limestone is highly prized. Around the mineral springs, chiefly in the southern part of the state, have grown up watering places like French Lick and West Baden, and the waters also are bottled.

How the State Was Settled

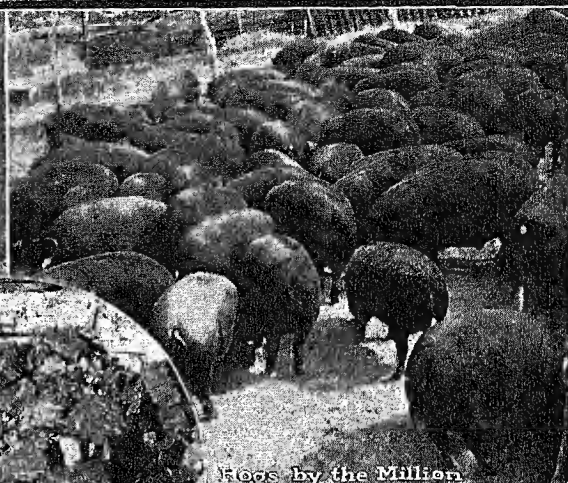
Most of the industrial towns are in northern Indiana. This is partly because the people from the south, who mainly settled the southern half of the state, were more inclined to agriculture than to manufacture; partly because of the early start given the northern industries by natural gas; and very largely because of the superior transportation facilities in the north, due to the railroads and Lake Michigan. Yet the northern region was not settled until long after the southern portion had become comparatively well populated. Until the National or Cumberland Road was opened in 1834, from Cumberland, Md., to Indianapolis, there was no avenue of approach for the north comparable to that afforded by the Ohio River and lower Wabash for the south. About the same time a road was constructed across the state from Lake Michigan to the Ohio—from the site of Michigan City through Indianapolis to Madison; and lake traffic became important as the settlement at Chicago developed after 1833. A wave of immigration swept over northern Indiana from New England, New Jersey, New York, and Ohio.

Indiana boasts more than 20 colleges and universities. Indiana University, at Bloomington and Indianapolis, includes the state schools of arts and sciences,

INTERESTING FEATURES OF "THE HOOSIER STATE"



The "Big Four" of the Farms



Hogs by the Million



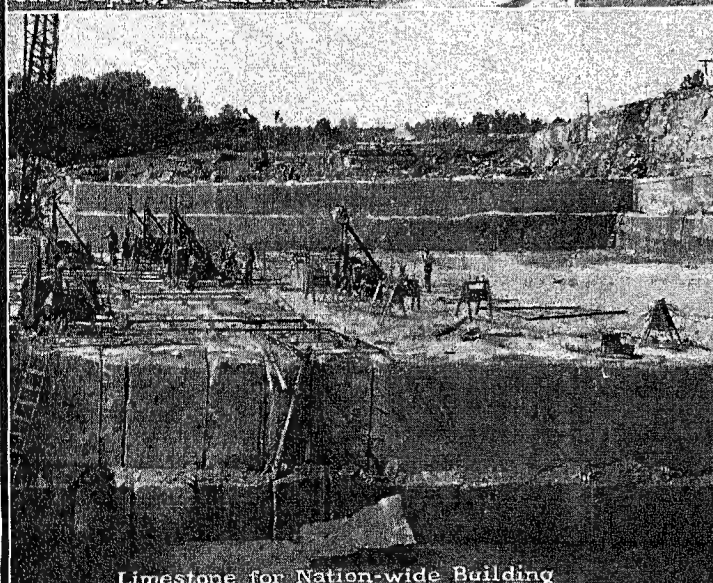
Immense Coal Fields



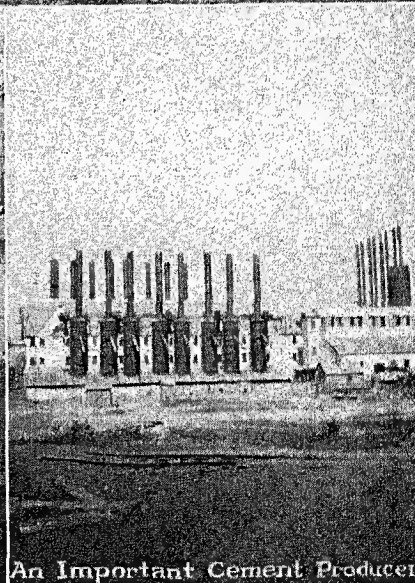
The Capitol at Indianapolis



Maxwell Hall, Indiana University



Limestone for Nation-wide Building



An Important Cement Producer

Indiana's wealth is drawn largely from her abundant natural resources. Corn, apples, potatoes, wheat, and hogs come from her rolling fields, and underground are stores of coal, gas, and excellent building stone. In the great region in the north from Chicago to Gary are some of the country's largest steel mills. Indiana is also fortunate in possessing raw materials for cement making. The building stone quarries of Indiana are among the most famous in America. The picture in the lower left-hand corner shows how the noted "oolitic" limestone is cut right out of the earth in great blocks for shipment to all parts of the country. Indiana also has large quantities of fine clay for brick and tile making.

law, medicine, education, and commerce. Purdue University, at Lafayette, comprises the state schools of agriculture, science, engineering, pharmacy, and home economics. There are also several teachers colleges.

The Hoosier is a natural story-teller, and the home-spun literary tradition of Indiana is a heritage from pioneer times. Edward Eggleston's 'The Hoosier Schoolmaster' was one of the earliest attempts to picture the raw frontier life of this country in fiction. Some Indiana writers, like that "Hoosier Arab," Lew Wallace, have gone abroad for inspiration, but others glory in being "provincial." James Whitcomb Riley was by common consent the state's poet laureate. American literature is also indebted to Indiana for Booth Tarkington, George Ade, Meredith Nicholson, Gene Stratton Porter, William Vaughn Moody, Albert J. Beveridge, Elmer Davis, Theodore Dreiser, George Barr McCutcheon, Annie Fellows Johnston, Claude G. Bowers, Joaquin Miller, David Graham Phillips, and other notables. To art, Indiana has contributed William Merritt Chase and the cartoonists, "Kin" Hubbard and John T. McCutcheon.

Indiana's history is starred with illustrious names. Abraham Lincoln spent his youth there, near the Ohio line. President Benjamin Harrison was a "Gentleman from Indiana," as were vice-presidents Schuyler Colfax, Thomas A. Hendricks, Charles W. Fairbanks, and Thomas R. Marshall. The noted engineer, James B. Eads; the Studebakers, known first for their wagons and then for their automobiles; James Oliver, a famous plow maker; the philanthropists Chauncy Rose and Washington De Pauw (for whom De Pauw University was named); and Hugh McCulloch, a secretary of the treasury, are all in Indiana's Hall of Fame.

LaSalle Comes Down the Ohio

French Canadian or half-breed trappers and hunters—*coureurs de bois*—ranged the Indiana woods before La Salle passed down the Ohio River in 1669 and came back to trade with the Indians ten years later. For 50 years thereafter, only fur traders and Jesuit missionaries shared these forest solitudes with the Indian tribes—the Miami, Kickapoo, Piankishaw, Munsee, Delaware, Wyandotte, Shawnee, and Potawatomi. The French were satisfied to claim the land for France, control the fur trade, and try to Christianize the Indians. Shortly before the middle of the 18th century the French settled at Fort Vincennes.

The Wabash country was seized by the English following the fall of Quebec in 1760. It was won for America during the Revolution when Col. George Rogers Clark and his Virginia riflemen forced the surrender of the British commander of the Northwest at Fort Sackville, in Vincennes, Feb. 25, 1779. It later became part of the Northwest Territory (see Clark, George Rogers). Settlers were at first kept out by fear of the hostile Indians. Gen. Anthony Wayne scored his notable victory over the Indians at Fallen Timbers in 1794, but after the determining of new boundary lines for Indiana territory in 1809 (see Northwest Territory), the Indians resumed their

attacks. They were utterly defeated by forces under Gov. William Henry Harrison, later president, in the famous battle of Tippecanoe, near Lafayette. (See Harrison, William Henry; Tecumseh.)

Indiana became a part of the Union Dec. 11, 1816. At first the seat of government was at Corydon, but in 1825 it was moved to Indianapolis. After the final clearing of Indian title by the "New Purchase" of 1818, the state rapidly advanced. Between 1816 and 1830, the population increased from about 65,000 to nearly 350,000.

George Rapp (1757–1847) and his German followers in 1814 started a prosperous communistic colony, called New Harmony, on the Wabash. The colony sold out to Robert Owen, English socialist, in 1824. Brilliant scientists worked in Owen's settlement, among them Thomas Say, "father of American zoölogy"; Charles A. Lesueur, French naturalist; William McClure, "father of American geology"; and the geologist David Dale Owen. Quarrels ended the communistic experiment, but New Harmony remained a center of culture.

Between 1828 and about 1838, the state was "delirious with the fever for internal improvements." Roads, when properly constructed, remained a permanent gain, but the many canals built proved a failure, and the program left the state bankrupt.

Led by a great war governor, Oliver P. Morton, Indiana fought spiritedly for the Union in the Civil War. Confederates under Gen. John Hunt Morgan raided part of the state in 1863, but were captured.

Indiana's second constitution has been in effect since 1851. The governor is elected for a four-year term and the legislature meets biennially. Cities are governed uniformly by a municipal code which aims to separate executive, legislative, and judicial powers.

The origin of the state's nickname, "Hoosier," is uncertain. A popular explanation is that pioneers often used the expression "Who's yere?" (Who is here?) which became shortened by pronunciation to Hoosier.

INDIANAPOLIS, IND. The symmetry and much of the beauty of Indianapolis arise from the fact that it is a "made-to-order" city. In 1820, four years after Indiana had been admitted to the Union and two years after the Indian title to this region was extinguished, the state legislature determined to plant the capital in the exact geographical center of the state. Choosing a site on the west fork of the White River, they cleared the trees away, made a circular central plaza with four diagonal avenues radiating from it, and laid the other streets in the usual checkerboard. Later the trees so ruthlessly destroyed were abundantly replaced.

Aside from its central location, Indianapolis has no great natural advantages, for the White River is not navigable at this point, but the early enterprise and the prosperity of its citizens soon attracted railway builders. The first line reached the city in 1847, and others followed rapidly. Today nearly a score of railroads radiate from the city, making it the largest

city of Indiana and one of the most important commercial and industrial centers of the Middle West.

The Indiana World War Memorial Plaza contains the national headquarters of the American Legion, a mall, Obelisk Square where a 100-foot black obelisk rises from a fountain, and a main shrine building. Other notable public buildings are the State House and the County Court House, both built of the oolite limestone for which Indiana is famous and symmetrically placed at equal distances from the central plaza. In this central plaza, called Monument Place, where the Governor's Mansion stood in early days, is the beautiful Soldiers' and Sailors' Monument, 285 feet high, counting the 38-foot bronze statue of Victory which crowns it. The fountains at the base are said to be among the largest in the world, with a capacity of 18,000 gallons a minute.

The city has several important educational and charitable institutions. Among them are branches of the State University (including the School of Medicine), Butler University, Indianapolis Children's Museum, Indianapolis Symphony Orchestra, Indiana School for the Blind, and Indiana State School for the Deaf. Northeast of the city is the army post Fort Benjamin Harrison. The $2\frac{1}{2}$ -mile motor speedway is famous for its 500-mile race run annually on Memorial Day. At the Municipal Airport is a laboratory for testing airplane radio equipment. The industries include meat packing, printing and publishing, and the manufacture of high-speed airplane engines, motor vehicle bodies and parts, foundry and machine-shop products, paper and paper products, paints and varnishes, drugs, furniture, silk hosiery, and men's clothing. Indianapolis is also a large grain market. Population (1940 census), 386,972.

INDIAN OCEAN. Two thousand years ago, when mariners were still venturing only the most cautious coastal voyages along the Atlantic coast, the Indian Ocean could already boast established trade routes,

and the Egyptian Greeks boldly made their way across the open sea between Arabia and Hindustan though they had neither chart nor compass. They had nothing to fear if they avoided the hurricane months from December to April, for they had observed that the monsoon winds blow half the year in one direction, half the year in the opposite.

Washing the shores of Asia on the north, the Antarctic continent on the south, Africa on the west, and the East Indian islands, Australia, and Tasmania on the east, the Indian Ocean is the third largest of the five oceans. Its length from north to south is somewhat over 6,500 miles, its breadth 4,000 to 6,000 miles, and its

area about 27,500,000 square miles. The average depth is between 11,000 and 14,000 feet, the deepest sounding so far being 22,968 feet off the south coast of Java.

At Cape Comorin, the southern tip of India, the Indian Ocean forks into the Bay of Bengal on the east and the Arabian Sea on the west, the latter branching again into the Persian Gulf. Beyond the Arabian peninsula it connects with the Red Sea. From Asia several great rivers enter it, the Ganges, the Brahmaputra, the Irrawaddy, the Indus, and the junction of the Tigris and Euphrates known as the Shatt-el-Arab; and from Africa the Zambezi and the Limpopo. Its great islands are Ceylon and Madagascar, the rest of them—the Laccadives, the Maldives, Socotra, the Andamans, Nicobar, Mauritius, Reunion, Kerguelen's Land—being mostly small groups of volcanic or coral formation.

INDIANA'S TRIBUTE TO HER HEROES



The Indiana State Soldiers' and Sailors' Monument is one of the conspicuous adornments of Indianapolis. It is 285 feet high.

OUR RED-SKINNED COUSINS

The First Americans



Chief Yellow Boy gives the peace sign. Note his native finery of wampum strings and porcupine quills.

INDIANS, AMERICAN. When Columbus landed in the New World on Oct. 12, 1492, he found himself among strange-looking people with bronze or copper-colored skins and straight black hair. In his letter to the king of Spain telling of the new-found land, the discoverer called these natives *Indios*, because he thought he had reached India. This mistake of Columbus has been handed down to the present day and we still call these people "Indians," though we add the word, American, to distinguish them from natives of the real India on the other side of the world. Scholars often employ the shortened term, "Amerind"; the terms, "red race," "redmen," and "redskins," are also widely used.

When it was found that the American natives were not the East Indians of

Asia, people began to wonder whence they came. Some believed they were descendants of the "ten lost tribes" of Israel and many books were written to support this theory; others thought they were traceable to the Polynesians, the Phoenicians, the Egyptians, the Norse, or to other peoples of the Old World. Anthropologists now generally believe that they had their origin in northeastern Asia; for though the languages of the Siberian natives have few similarities to those of the Indians, with the exception of the Eskimo, there is a strong physical resemblance between northeastern Asiatics and the Indians of northwestern America. It is assumed that Asiatics migrated gradually and in relatively small numbers to the American continent by way of the Aleutian Islands or Bering Strait, and that in time they spread over the western hemisphere from the shores of the Arctic Ocean to the southernmost tip of South America.

This peopling of America may have begun 10,000 years or more ago. In Gypsum Cave, Nev., we have found evidences of the presence of man together with the remains of animals that became extinct

ages ago; and in New Mexico beautifully chipped flint arrow-points have been unearthed among the deeply buried bones of an extinct species of buffalo. These instances are exceptional, and nowhere in America has there been discovered any human skull comparable in age with various ancient skulls found in the Old World. Still we feel certain that men came to America long ago

because of the many centuries it must have taken them to spread throughout the two continents, blending their original languages and developing new ones. Furthermore, such peoples as the Aztec of Mexico, the Maya of Central America and the Inca or Quichua of Peru could not have attained their remarkable culture within a few centuries.

American Colonists and the Indians

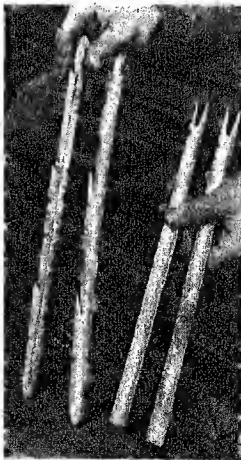
The white settlers of the Atlantic seaboard first came in contact with the Indians of the eastern woodland area, who occupied the country on both sides of the Great Lakes from the Mississippi River to the Atlantic Ocean. These included several hundred tribes and spoke a number of languages and many dialects; but all had somewhat similar traits, customs, and beliefs. They made pottery, baskets, and vessels of birch bark. They gathered such wild edible products as fruits, nuts, seeds, roots, and greens, and practised agriculture to some extent; but hunting and fishing were the chief means of subsistence. Along the coast and streams from Maine to Virginia, enormous quantities of shellfish were consumed, as we know from the shell heaps remaining in many places to this day.

Nearly all these Indians belonged to the great Algonquian family. The northern group of this family included the Cree, Mississauga and Algonquin of Canada, and Ojibwa (Chippewa) and Ottawa on both sides of the boundary line. In the northeastern group, living in Canada and extending into Maine, were the Montag-



This Indian mother is carrying her baby, warmly wrapped in a soft deer-skin coat, in the approved fashion of her race. A necklace of porcupine quills sets off her elaborate raiment.

ANCIENT WEAPONS



Ivory spear heads found in Aleutian graves tend to substantiate the theory that American Indians came originally by way of the Aleutians from Asia, a home of the elephant.

INDIAN LIFE OF LONG AGO IN THE EASTERN WOODLANDS



This picture tells many things about the culture of the tribes in the eastern part of the United States and Canada. They built dome-shaped bark wigwams and birch-bark canoes; they were hunters and farmers; they ground their corn with a mortar and pestle; and they wove baskets and rugs and made pottery. The youngest member of the family was hung from a tree trunk in his cradle while his mother worked. When the mother wished to carry her baby about she fastened him to her back, cradle and all.

nais and the Abnaki, the latter including the Micmac, Malecite, Passamaquoddy, Penobscot, Norridgewock, and others. The central division of the family comprised the Menominee (whose name refers to their use of wild rice), Sauk (Sac), Fox, Kickapoo, Mascouten, Potawatomi, Peoria, Kaskaskia, Miami, Piankashaw, and Wea, residing in Wisconsin, Illinois, Indiana, Michigan, and Ohio. The eastern division included the tribes extending from Maine southward to North Carolina—the Pennacook, Massachuset, Wampanoag, Narraganset, Mohegan, Mahican, Wappinger, Delaware (Lenape), Shawnee, Powhatan, and many others. It was these tribes who figure in the early history of the English colonists.

The names of "King Philip," Canonieus, Uncas, Miantonomo, Squanto, Massasoit, and Samoset are prominent in the relations between the colonists and the Indians of Massachusetts (see these names in Fact-Index). Even more famous is the great chief, Powhatan, father of Pocahontas, whom Capt. John Smith encountered in Virginia in 1607. It was from the Wappinger that Peter Minuit gained permission to settle on Man-

hattan Island in 1626, giving in return beads and trinkets worth about \$24. Tradition regards this as the purchase price of Manhattan, but the Indians actually had no thought of parting with their birthright, there or elsewhere. William Penn treated with the Delaware in 1682 for lands which included the site of Philadelphia. The celebrated Pontiac, leader and warrior, was an Ottawa, while the equally noted Tecumseh and his brother, the Prophet, were Shawnee.

In the Far West was another branch of the Algonquian family including the Blackfeet, Cheyenne, and Arapaho. They lived along the eastern slopes of the Rocky Mountains and were buffalo-hunters and fierce warriors.

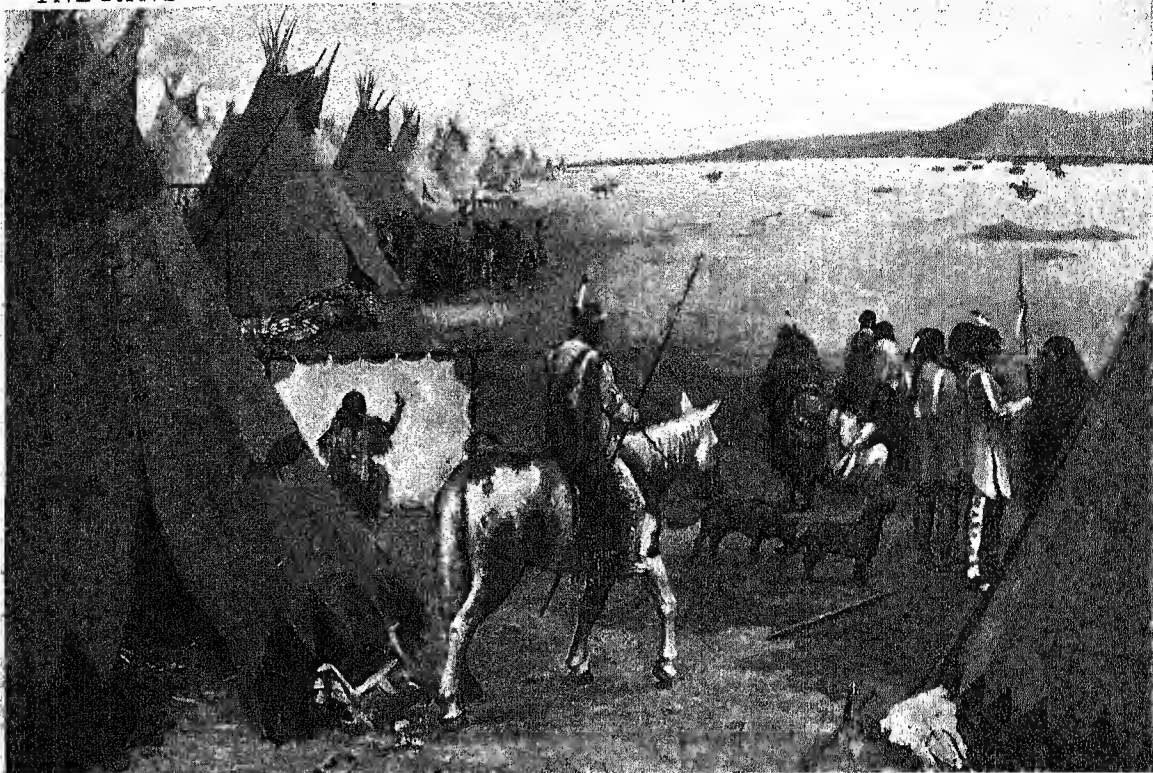
Extending from the valley of the St. Lawrence in Canada southward into Pennsylvania, and especially in what is now New York State, were the progressive but warlike Iroquois. These were called by the English the Five Nations because, about 1570, the Mohawk, Onondaga, Oneida, Cayuga, and Seneca formed a confederacy—a sort of Indian League of Nations—to abolish war with one another. From 1722, when the related

A MODERN SEMINOLE



Bright striped costumes are a characteristic garb of the Seminole Indians of the Everglades. This small band of a few hundred has never been conquered and still holds aloof from the white man.

INDIANS OF THE PLAINS AND THEIR BUFFALO-HIDE TEEPEES



Unlike the Indians of the eastern woodlands, these Plains Indians ranged far and wide, in pursuit of the bison, which furnished them food, shelter, and clothing. So, as you see, they did not live in permanent houses but in tents or teepees covered with buffalo hides, which could be quickly taken down and moved. In the far distance you see hunters riding toward a herd of buffalo. The mounted brave in the foreground is starting to join them, while the woman at his left is scraping a hide.

Tuscarora tribe of North Carolina joined them, the league became known as the Six Nations. Their name carried terror to whites and Indians alike; for, after acquiring firearms from the Dutch, they extended their conquests over neighboring tribes from the Ottawa River in Canada to the Tennessee and from the Kennebec to the Illinois River and Lake Michigan. Champlain (*see* Champlain, Samuel de), made the fatal mistake of joining a party of Canadian Indians against the Iroquois, and thus aroused a hatred against his nation which lasted until the British, with the aid of the Iroquois, wrested Canada from the French a hundred and fifty years later.

The Iroquois were noted for their highly developed social and political system, in which the women played a prominent part. The game of lacrosse, adopted as the national game of Canada, originated among them.

Tribes of the South

South of the Algonquian tribes and the Iroquois, were the Cherokee, living in what is now Virginia, North Carolina, South Carolina, Georgia, Tennessee, and Alabama. They were related by language to the Iroquois, but the two groups were enemies.

Farther southwestward and westward, inhabiting the territory from the Georgia coast to the Mississippi River and from southwestern Kentucky to the Gulf of Mexico, were the tribes of the Muskogean family—

Creek, Chickasaw, and Choctaw, and, after their separation from the Creek in the early 18th century, the Seminole (meaning "runaway"). These tribes were agricultural, living in villages which were moved from place to place as occasion necessitated, especially when their farm lands became exhausted. They made pottery, carved stone objects with a high degree of excellence, and wove some fabrics. All—especially the Creek—had a complex political organization and elaborate religious ceremonies.

Habits of the Plains Indians

The greatest rovers among the early Indians were those who inhabited the Great Plains, between the Mississippi and the Rockies. The buffalo was the source of their food, clothing, and shelter, and so their lives were prolonged hunts for this all-important animal. The principal buffalo-hunting tribes were the Sioux or Dakota, the Cheyenne, Arapaho, Comanche, Kiowa, and the Apache of the plains. Others like the Pawnee, Wichita, Arikara, and Caddoan tribes of Texas and various Siouan tribes (Osage, Oto, Missouri, Omaha, Ponca, Quapaw, Mandan, Hidatsa) were both buffalo-hunters and farmers.

West of the Great Plains were Shoshonean tribes—Shoshone, Bannock, Ute, Paiute, Paviotso, and others—who were very low in the scale of culture. Indeed the Indians of the California-Nevada desert region

were among the most primitive of all tribes. Their habitations were the rudest brush shelters; they subsisted entirely on what their inhospitable land afforded, including insects and larvae, and their clothing was so scant that it afforded them little protection against the rigors of the weather.

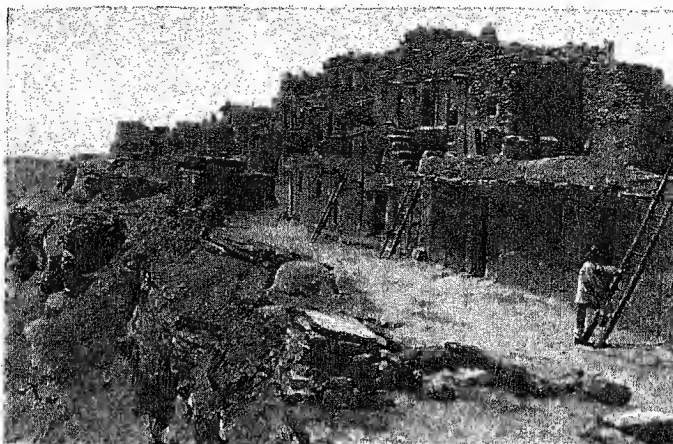
In Arizona and New Mexico lived the remarkable group of tribes called Pueblo (see Pueblo

Indians). These people were constantly beset by their neighbors, the Apache and Navajo, tribes of the Athapascan family who had migrated to the Southwest from Canada in their quest for the buffalo. This tribal war was at its height when the United States took possession of New Mexico in 1848. The Navajo proved a serious problem to the American authorities; they violated treaties and defied military authority. In 1863, Col. Kit Carson commanded an expedition against them and killed so many of their sheep that they were faced with the prospect of starvation. Most of the tribe were taken prisoners and were held at Fort Sumner on the Pecos River until 1867. Chastened by this treatment, they were then sent back to their old homes and given a new supply of sheep. The Navajo, originally hunters, now became a pastoral people and developed the arts of spinning and weaving to a remarkable extent. Their blankets and their excellent silverwork, embellished with settings of native turquoise, are still famous. Their hundreds of thousands of sheep are now owned by the women of the tribe, while the men are making

good progress in farming their land by irrigation. Somewhat similar was the history of the Apache. They made their final depredations under Geronimo in 1886, when they were overpowered by American troops. Since then, they have engaged peaceably in farming in their reservation. The Apache women are unusually clever in the art of basket weaving.

The region along the Colorado River, extending

WALPI, A CITADEL IN THE DESERT



The Hopi Indians of Arizona built their villages on flat-topped hills, or mesas, as a protection against enemies. Some houses are constructed on the roofs of others, and are reached with ladders. Several of these old villages, such as Walpi, shown here, are still inhabited.

across southern California and into Arizona, was the home of the Yuman tribes—Yuma, Mojave, Walapai, Havasupai, Cocopa, Diegueños, and others who never reached an advanced stage of culture. Tribes of this stock also occupied the whole of Lower California, but they are now extinct. Of the same family were the Maricopa, neighbors of the more progressive and peaceful Pima and Papago

of the Gila River basin in Arizona and the adjacent Mexican state of Sonora. They were excellent farmers and basketmakers, and served as a bulwark against the Apache Indians in the settlement of this rich country by the white men.

The "Mission" Indians

North of the Diegueños lived a large number of settled Indians, divided into many families and speaking various languages. It was among some of these that Spanish missions were established in the 18th century; but mission life with its restrictions was unsuited to these people and they died in great numbers. It is estimated that the Indian population was from 150,000 to 200,000 when the Spaniards settled California; now there are only about 23,000 including mixed-bloods, in the entire state.

Many of the "Mission" Indians, as well as others

in the north, especially the Pomo and the Washo of the Nevada border, made baskets nowhere excelled in beauty. They were in no sense farmers, not even raising corn. Those on the coast, islands, and larger streams were fishermen. Those of the interior ate



Pottery making was developed to a fine art among the Pueblo Indians. They did not know the use of the wheel, but beautifully shaped vessels were fashioned by hand from coils of clay. Very elaborate designs were painted on them and they were then fired. Many primitive peoples beautify their cooking utensils.

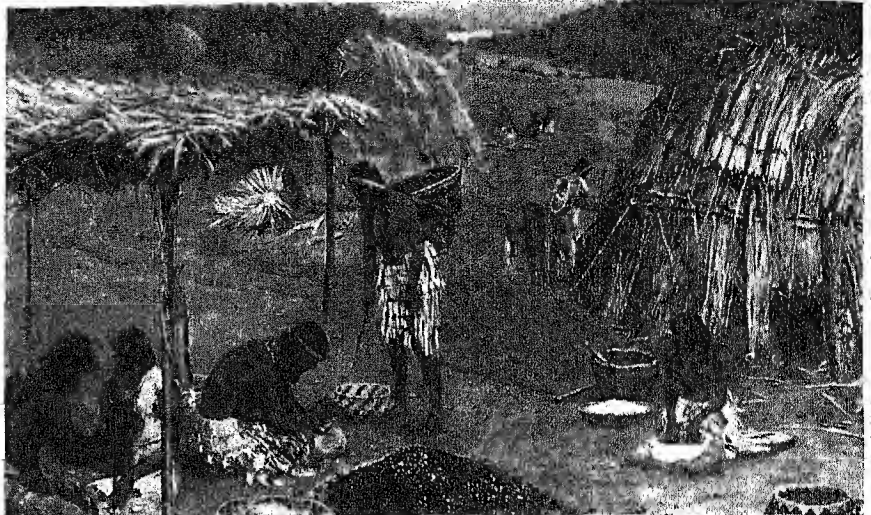
acorns and other seeds, fruits, and insects, and hunted wherever their country afforded game.

In Oregon, Washington, and northern California were a number of small Athapascan tribes which, in early times, had migrated down the coast from northern Canada. Most important among these are the Hupa of California, noted for their fine baskets. Also in Washington and extending into Idaho, Montana,

HOME LIFE AMONG THE CALIFORNIA INDIANS

and British Columbia were the various Salishan tribes and many others, as the Klamath, the Modoc, the Yakima, the Cayuse, the Kutenai, and the Nez Percés, each with a culture suited to its environment. Those of the eastern area were the more primitive, living chiefly by hunting and fishing, building only rude houses, chiefly underground, and having a simple organization; yet most of them wove excellent baskets and bags.

From Vancouver Island northward to Alaska, the Indians—Haida, Tlingit, Kwakiutl, and Tsimshian especially—built capacious homes of logs and planks, sometimes carved and painted with figures of mythical personages. For whaling, fishing, and warfare, they went to sea in large dugout canoes. Before their houses stood tall totem poles made from cedar trunks and painted to represent the crests of the occupants or to illustrate legends. There were also memorial columns, similarly carved and painted. These Indians were artists in woodwork, copperwork, painting, and weaving. Especially famous are the blankets made by the Chilkat, a division of the Tlingit. The elaborate and grotesque masks used in ceremonies often represented mythical animals or supernatural



Some California tribes were very low in culture. They neither hunted nor farmed, but lived on roots, acorns, seeds, and fish; their houses were flimsy brush shelters. Strangely enough, they wove beautiful baskets, which were their only cooking utensils. At the left a woman is twirling a stick to make fire, probably to cook the acorn-meal bread which her companion at the right is preparing. Notice the tump-line which helps support the basket of the standing woman.

personages. The potlatch, or giving-away feast, at which the donor parted with all his property, was once a common ceremony. This is now forbidden by the Canadian government.

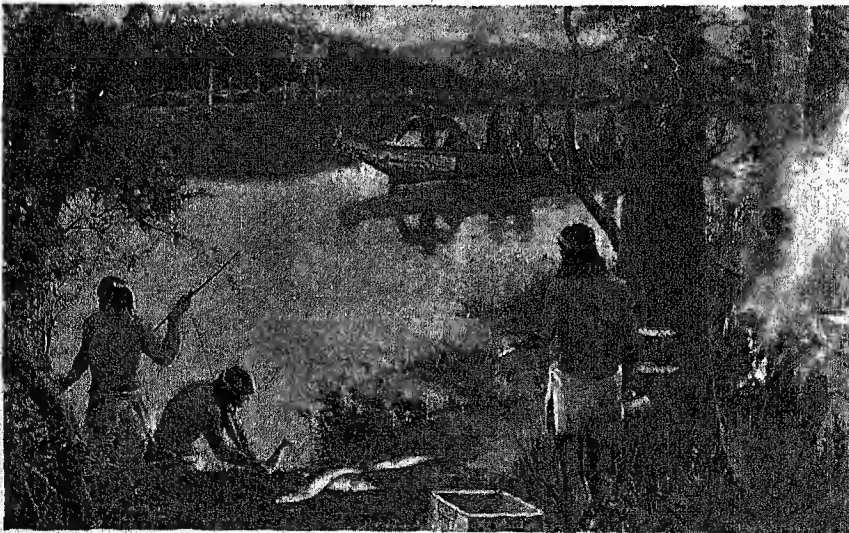
There were other tribes of Indians which had either disappeared or had materially changed their customs before the coming of the white people (see Basket-Makers; Cliff Dwellers; Mound-Builders). Many others have died out since. When the Spaniards first explored Florida, they found several well-advanced tribes such as the Timucua, which soon became extinct. In New England a number of tribes conspic-

uous in the history of the colonial period are now known only by name and the same is true of tribes in all sections. This was due to various causes—diseases and intoxicants introduced by the whites; intertribal warfare; massacres by the whites; restriction to mission life; confinement to limited reservations with insufficient food and insanitary housing.

Tribal Organization

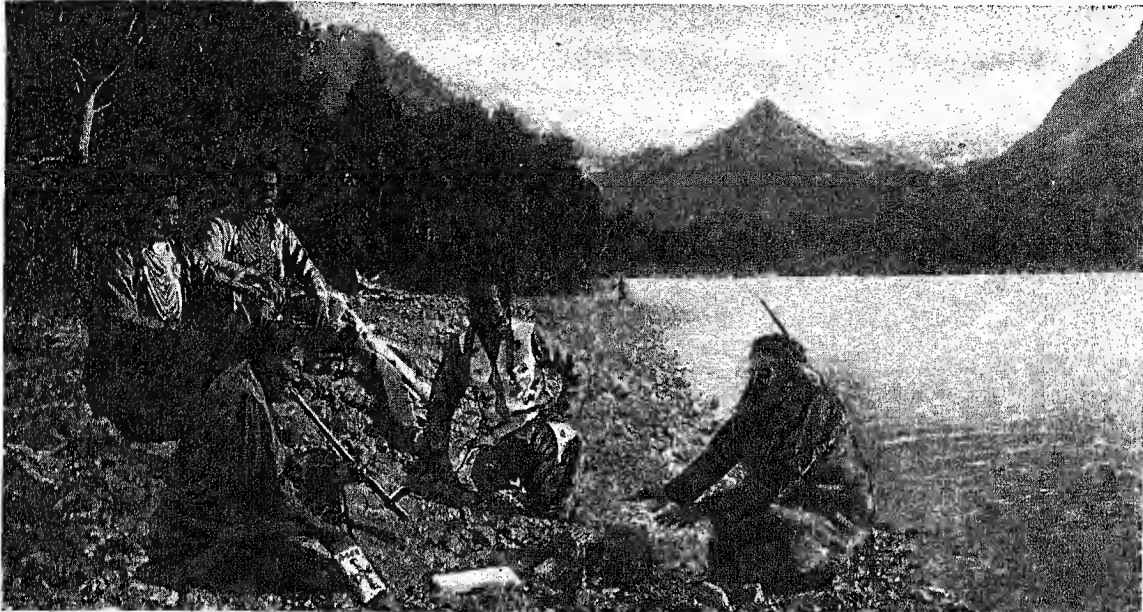
Though we think of these "first Americans" as a half-civilized race, many of them lived in a highly organized society. Clans consisted of a number of families; a group of clans was a tribe and

WOOD CARVERS OF THE NORTH PACIFIC COAST



Their totem poles, their huge dugout canoes, and sometimes even their sturdy log and plank houses were carved and painted with weird figures by these Indian artists of the far Northwest. The Indians at the left are spearing fish, which was their chief food, while the man at the right is felling a tree by gouging chips out of it with crude stone implements.

PROPITIATING THE GOD OF THE WATERS



Here a group of Blackfoot Indians is offering prayers to the god who rules the waters of the lake beside which they are seated. Every prominent aspect of nature had a presiding deity, according to Indian belief, and the prayers to each god consisted of fixed ceremonies. These were performed whenever deemed necessary by the medicine men. In this case the tribe might intend to go fishing, so naturally the favor of the Water God is being sought. Smoking the ceremonial pipe is part of the ritual.

several tribes with related interests formed a confederacy. The Iroquois, Creek, and Blackfoot are examples of confederacies. Not all tribes had clans, however, and the number of confederacies was relatively few.

The tribe was the principal unit of society and it commanded a loyalty and a centralized interest unlike anything in our modern social scheme. Relations within the tribe were of a very high order. Murder was rare and, in many tribes, entirely unknown. Theft and other crimes were severely condemned and restitution was enforced. The aged were respected. No one went hungry so long as there was food in the tribe. Strangers on friendly visits were entertained and sometimes enemies, too, if they sought the protection of a chief. Peace between tribes, once declared, was often held sacred ever after. This making of peace, agreed upon by men high in authority in each tribe, was sealed by the passing of the *calumet*, or ceremonial pipe. The pipe had two shafts, representing the fatherhood and motherhood of nature, and was painted and carved with symbolic objects. It had a perforation for the entrance of the breath or spirit, and was held sacred

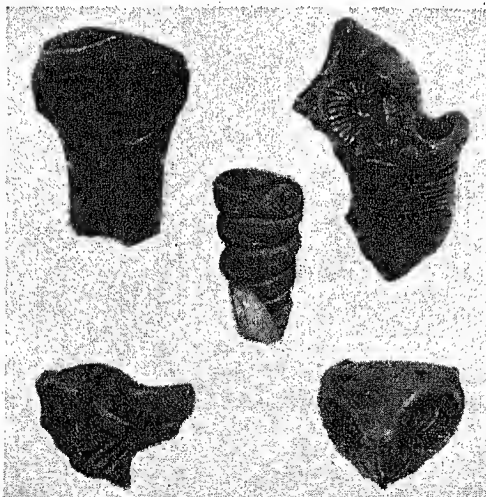
because of its close association with religious beliefs and ceremonies. Officials traveling from tribe to tribe used it as a passport and it was also used to invoke good weather and to banish evil spirits as well as for making peace. Dances and other ceremonies were conducted in honor of the *calumet*.

Chiefs were chosen in various ways. Among the

Iroquois and Creek, for example, there were civil chiefs and sub-chiefs, chosen for personal merit, as well as permanent and temporary war chiefs. In some tribes, chiefs were chosen for their wisdom, valor, and high character. In others chieftainship passed from father to son unless the son was unworthy; in that event, someone else was chosen. Some tribes had no real chiefs although certain prominent men might be consulted for advice; others were so dominated by a religious priesthood that no one individual could be regarded as the head man.

Everywhere women did what seemed to be the hardest work. They planted the squashes and the corn and beans from which they made succotash, an Indian dish, which, like hominy and many others, we have borrowed from them.

THE PIPEMAKER'S ART



Here are some interesting examples of art among primitive people—fragments of the stone pipes of the Iroquois Indians carved into strange forms.

A GLIMPSE OF AN INDIAN MOVING DAY



Among tribes that had horses, the head of the family rode in state with weapons ready to turn against foe or game. Two tent poles were fastened one to each side of the draft horse, forming a *travois* and all the baggage possible was lashed to the dragging ends. The woman carried the rest on her back, with a leather tump-line about the forehead to help support the load.

When the whites first came, the Indians of the New World were cultivating many kinds of beans, potatoes, tomatoes, pineapples, cacao, peanuts, pumpkins, manioc (the source of cassava and tapioca), the Jerusalem artichoke, cayenne pepper, the alligator pear, and many other food plants not so familiar to us.

The Indian woman dressed the skins of animals that the huntsmen killed, and made clothes for the family. She cooked the meat on sharp sticks over the fire or boiled it in vessels of pottery and stone. Sometimes she used pots of skin and heated the water by dropping hot stones into it. Until babies were able to walk, the mothers carried them on their backs or hung the cradle-board, to which the infant was strapped, on a tree while they did the household work. If the family wigwam or teepee was moved, it was the woman who looked after its transportation and set it up in the new location; she gathered fuel and built the camp fire by means of a pump-drill or by rubbing two pieces of wood together.

But the women were not mere drudges. They were in almost all cases the owners of the home and its belongings; they usually had absolute control of the children and often had a voice in deciding important tribal questions. Among the Iroquois, for example, the braves could not go to war without the consent of the women; and among the Pueblo tribes, the children belonged to the clan of the mother, whose control over them was absolute. Indian

women everywhere had their games and other amusements and in some tribes they had their own societies.

Marriage was usually effected in a very simple way, such as by the consent of the families of the young couple, followed by an exchange of gifts. Divorce was even simpler. In many instances a wife merely told her husband to go home to his people and the matter ended with that.

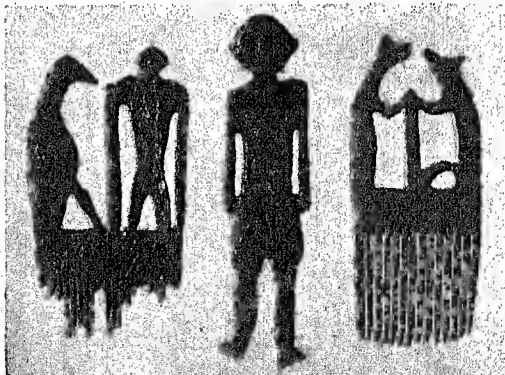
It might seem that the men had few duties left to them. However, they protected the tribe, provided the food, and conducted all the elaborate religious rites and ceremonials. Among the hunting Indians, there was woe to the man who did not bring home

game enough to supply the family larder, or who proved a coward on the warpath. The ridicule or disapproval of the women was more dreaded than the dangers of the forest. Whites have often criticized Indian men on the trail, carrying only bow and arrows, while their wives trudged behind, heavily laden. But in the old days, every foot of the journey was often beset with grave danger from enemies and the men had to be unburdened and ever ready.

Surrounded by enemies who disputed his title to his hunting grounds and obliged

to struggle constantly for a bare living, it was natural that the Indian should prize warlike qualities above all others and train his sons to fight hard and with little mercy. A brave wishing to win glory for himself would announce that he was going against an enemy.

COMBS WORN BY INDIAN BELLES



As far back as we have any record women have used combs in dressing and decorating their hair and immense amounts of time and effort have gone into making them. These combs, made from the antlers of deer, at one time adorned the black locks of Iroquois belles. The figure in the center was once part of a comb.

He would invite others to join him, and so the conflict would begin. The higher the reputation of such a leader, the greater his following. Since Indian warfare was carried on with craftiness and deceit, it required much more intelligence than simply open fighting.

When occasion demanded, however, the Indian warrior never hesitated to expose himself to the gravest danger. Frequently, for revenge or for a grim warning to intruders, the warriors massacred men, women, and children, and took as many scalps as possible. Yet it must not be supposed that all Indians practised scalping; indeed, many of them did not do so until after the whites offered bounties for Indian scalps. Sometimes the warriors took a few prisoners to their

circular houses, known as earth lodges, consisting of a series of posts and cross-beams, with a wide roof and sloping sides covered with willow and brush matting, and sod or earth. The typical grass lodge was that of the Wichita; it was of dome shape, 40 to 50 feet in diameter, made of bent saplings tied in place and covered with bunches of grass fastened shingle-fashion. In Florida and Louisiana the dwelling was similar in form, but was covered with palmetto leaves. In early times, however, the houses of Florida

IROQUOIS BUILDING A VILLAGE



IROQUOIS LEAGUE PRINCIPLES
Ne' Sken'no, Ne' Gai'hwio, Ne' Gashasde'sa
FREE TRANSLATION—PEACE, PROSPERITY, POWER AND EQUITY FOR ALL.

In little clearings the Iroquois built stockades for protection from enemies, and within these walls the life of the community centered. Longhouses, built of poles covered with bark, were divided into compartments, each containing a fire shared by two families. There was also a council house in which the older men, and sometimes women too, met to settle affairs of government. The model shown here bears on its base the principles of the Iroquois League: "Peace, Prosperity, Power, and Equity for All."

camp or village to test their fortitude by torture, and occasionally some of the younger prisoners were adopted. Captive women were often taken into the tribe virtually as slaves; at other times they were married into the tribe and became respected members of it. A dance of victory commonly followed a successful raid, and if a scalp was taken it was stretched on a small hoop, painted, and made an object of a ceremony, commonly called the Scalp Dance. In some tribes the heart of an exceptionally brave enemy was divided among the warriors and ceremonially eaten in the belief that by so doing they might share the essence of his valor. This has given rise to the belief that some of the tribes were cannibals; but, in fact, true cannibalism was practised by the American Indians only under stress of great hunger.

The Indian Home

To guard against surprise attack, the Indian often fortified his village with palisades, as among the Iroquois in New England, and in the South. The clustered houses of the Pueblo Indians were actual forts, like the cliff dwellings. The "longhouse" of the Iroquois, 50 to 100 feet long and 15 to 18 feet wide, was built of a frame of poles, with sides and arched roof covered with bark, usually of the elm. The interior was divided into compartments, each with its fireplace for the use of two families. The Mahican dwelling, similar in form, was 14 by 60 feet and had sides and roof of rushes and chestnut bark. The Omaha, Mandan, Hidatsa, Arikara, and Pawnee erected large

and of North Carolina were either circular with dome-like roof or oblong with rounded roof. The frame was of poles and the sides and roof were covered with bark; sometimes the roof was thatched. The houses of the Chippewa were usually constructed of a conical or hemispherical framework covered with bark, whereas those of the Menominee were covered with woven grass mats.

These "wigwams," or fixed houses, were very different from the portable skin tent or teepee (tipi), of the roving Plains Indians. A teepee consisted of poles spread to the desired diameter of the dwelling at the base and brought together and tied near the top. This framework supported the buffalo-skin covering. An opening in the side served as the entrance. These dwellings were dragged originally by dogs, with a small tent pole fastened to each side; but after horses were introduced by the Spaniards they took the place of dogs and the teepees were made much larger. Thus, the character of the country largely determined the way the Indians lived. The Plains Indians, for instance, who subsisted almost entirely on the buffalo, which was followed from place to place, needed houses that they could carry wherever they went; therefore they used the material at hand—buffalo-skins, which the women tanned and sewed into comfortable dwellings that could be taken down and set up again in a very short time. Other Plains Indians, however, did not depend on game alone for their food; they were farmers, who cultivated corn, beans, pumpkins,

squashes, and other vegetables, and so they developed a settled mode of life. The Pawnee of Nebraska built permanent and substantial houses of logs and earth; and the Wichita of Kansas (later of Oklahoma) and other Caddoan tribes in Texas used grass for the construction of dwellings. The Pueblo Indians, who raised crops by irrigation in a region over 6,000 feet above sea level, where the winters were very cold and where enemies constantly threatened them, built homes like forts. These dwellings, terraced one above another, were reached by ladders that were drawn up at night. Stone in abundance was usually near at hand; if not, there was clayey earth everywhere which needed only water for making it into substantial bricks, which were dried by the sun.

In contrast to the dwellings of the Indians of the northwest coast, which were built of great planks, often carved and painted, with house posts and totem poles, those of some of the tribes to the south in California were of much simpler plank construction; others were dome-shaped lodges covered with earth, or were conical and thatched with tules, a kind of bulrush. The houses of the Apache were at first flimsily built of brush or skins, and later, of canvas. Their Navajo cousins, however, lived in substantial *hogans*, generally conical, of logs and earth. The Pima and Papago built dome-shaped dwellings over shallow excavations, and covered the framework, which was formed of logs and poles, with arrow-weed or grass plastered with clay.

In all Indian houses the smoke found its way through a vent in the top, for chimneys were unknown

then. Generally the houses were very smoky, and in summer too warm for comfort; hence during that season the family often lived in a simple shelter constructed of poles, with roof and sides of skins, matting,

or brush; sometimes the sides were left open. As the one-room dwelling was the center of all domestic activities and the only place where the household goods as well as the food supply could be kept, it was not always clean and orderly according to present-day standards.

Yet, notwithstanding the smoke and heat and lack of space, the Indian families were far from unhappy. They delighted in many games of chance, such as the basket game and the bowl game, in which dice were tossed, or the guessing game, in which a ball or a stick

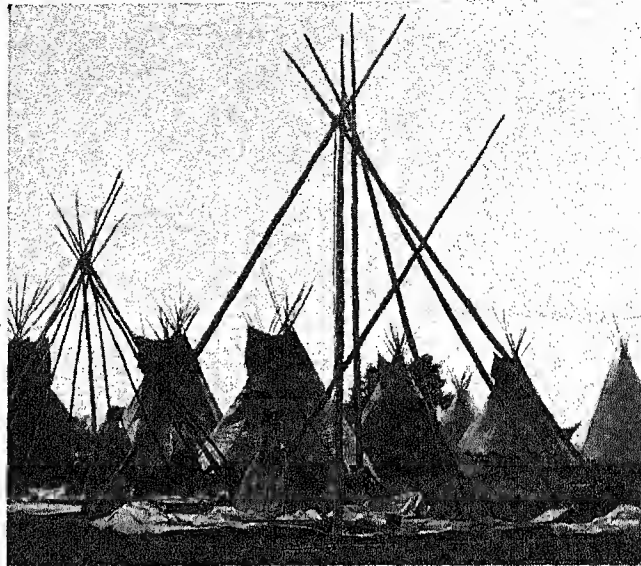
was hidden in one of several wooden tubes. The Indians had scores of other games for both indoors and outdoors. In these the players displayed great skill

and laughed just as heartily when beaten as when victorious.

Both boys and girls made merry with ball games and other amusements that varied with the tribe and the locality. The boys flew kites of fish-bladders, spun teetotums, played at tag, hide-and-seek, battledore and shuttlecock, and blind man's buff; they also made string figures, or cat's cradles, just as we do today. Zuni boys practised the stick race by kicking a small round stick over the trail in order

to become expert by the time they reached manhood, when the race became a serious contest and covered many miles. Boys learned to ride ponies when mere tots. Girls enjoyed their strange-looking dolls, usually made in the image and with the dress of real Indian

A MODERN BLACKFEET CAMP IN THE MAKING



Women evidently still do the heavy work. For these teepees 14 poles were used, though the number may vary; 2 of these are breeze poles, which were fitted to the flags of the teepee on the outside, for draft, to be swung as the wind changed.

ARCHITECTURE AMONG THE APACHE



While the Pueblo Indians built substantial stone and mud villages, the hunting tribes were content with simple houses. The Apache used arched branches covered with skins and later with canvas, such as the dwelling this woman and her daughter are building.

INDIAN ARCHITECTURE AT ITS BEST



Although most tribes contented themselves with shelters made of grass or skins, some were quite advanced. This log house, built by the Creek Indians in the latter part of the 18th century, compared favorably with the houses erected later by the white settlers in the same territory. The tribes of the north Pacific coast also built log or plank houses.

people; but among the Pueblo Indians, dolls were made to represent the *kachinas*, or sacred personages of their mythology, often elaborately carved and painted. (See story article with Arizona.)

However, the girls and boys did not have much time for real play, as they were called on often to help their parents, and in this way they received most of their tribal education. Accompanying their fathers, boys learned to hunt, fish, or farm. The proudest day of their lives came when they were first permitted to accompany their elders on the hunt or the warpath. Little girls learned all the ways of the household from their mothers and grandmothers. Older people were always respected for their experience and wisdom, and punishment of any kind was very rare indeed for they were seldom disobeyed. Children were early instructed in the religion of their tribes, and as soon as they were old enough they took part in dances and other ceremonies. Names were given to children soon after birth. When they reached manhood or womanhood, another name was sometimes given, and among some tribes a brave deed in later life was recognized by the bestowal of still another name suggestive of the heroic act.

Most Indian clothing was made from deerskins tanned until very soft. The principal garments of the men were a shirt, leggings that reached to the hips, and moccasins; women usually wore low moccasins and a

dress that covered the body from neck to ankles. The dress of Pueblo women then, as it is still today, was of wool, beautifully woven, with a woolen belt wrapped several times around the waist; the deerskin leggings were either wrapped around the lower legs like puttees or formed a part of the moccasins, like boots. In winter a skin or woven robe was generally worn. Some of the Pueblo Indians, especially the Hopi, were distinguished as cultivators and weavers of cotton, of which most of their garments were made in early times.

For ornamenting the skin clothing, the Indians used dyed porcupine quills, elks' teeth, shell beads, deerskin fringes, and sometimes the hair of slain enemies. After the introduction of glass beads, these took the place of many other kinds of decoration. In the warm desert country little more than a loin-cloth or kilt was worn in the summer by the men, and a short skirt, sometimes of shredded bark, by the women. Tattooing was practised by a number of tribes and face-painting was general.

Personal adornment consisted of bead necklaces, earrings, and pendants made of shell, stone (including turquoise in the Southwest), seeds, and the teeth, bones, and claws of animals, as well as other materials which the Indian thought attractive or to have some magic power. Along the Pacific coast and on the adjacent islands the beautiful abalone shell was greatly used for ornaments of many kinds. Necklaces made of

AN INDIAN SUGAR BASKET



Minnesota Indians packed maple sugar in well-sewed birch-bark baskets. Maple sugar making was invented by the Indians.

human fingers, although not common, were worn by Cheyenne and other warriors. Feathers were much used, especially in the hair of the braves, when they signified honors gained in war. No man or woman not thus entitled would ever presume to wear them. The picturesque war-bonnet with its long trailer of eagle-feathers, once characteristic of the Plains tribes, has been adopted as a kind of gala dress by Indians generally, especially by "show Indians," including even women.

Elaborate ornaments of copper were made by Indians of the region of Lake Superior and by those of British Columbia and Alaska long before America was discovered. Such objects found their way by trade over hundreds of miles. Although ornaments of gold and silver were made by Indians north of Mexico in early times, they were rare; but after the coming of the whites, the Indians took a strong fancy to silver ornaments and made them in quantities—pendants, arm-bands, gorgets, brooches, earrings, bracelets, and the like.

How the Indians Traveled

Simple as were their lives, the Indians always had the ingenuity to make what they needed most from the materials they found at hand. For instance, in Canada and the northern part of the United States the Indians quickly learned that the bark of the birch tree, stretched and stitched over a light framework of wood, made excellent canoes which could be carried from one stream to another or around rapids and waterfalls. Other Indians, like those of Long Island Sound, New Jersey, the Pacific coast, and elsewhere, cut down entire trees and with the aid of fire, hollowed out the logs to make boats called dugouts. On the upper Missouri River the Indians made round "bull boats," so called because the framework was covered with buffalo-bull hide. In parts of California where bulrushes grow abundantly along the streams, the Indians gathered the stalks and fastened them

together in the form of a long narrow raft, which was hard to sink. Eskimos build excellent canoes, called *kayaks* and *umiaks*. A driftwood or whale-rib frame is completely covered with skin, and a hole in the top admits the *kayaker*.

The buffalo-hunting tribes, who needed some means for carrying their meat and baggage on long journeys, invented the convenient travois which is shown in the picture on page 58. This was at first drawn by dogs, but later by horses. All the Indians used the tump-line, a woven or skin band that passed over the forehead and thus eased the load carried on the back, whether in

a bundle or a burden-basket. When the Spaniards introduced horses into America in the 16th century, the Indians were able to travel greater distances in a much shorter time and with far less labor.

The Plains Indians, roving far and wide, soon became expert horsemen.

The Indian Languages

The only way in which the European colonists could communicate with the Indians was by learning the native languages or by teaching them their own. Indians usually learned enough of their neighbors' tongues to enable them to conduct trade or transact tribal business. On the Great Plains however, where buffalo-hunting Indians of unrelated speech met during their wanderings, a remarkable sign language grew up. This was so perfectly developed that a conversation on any subject could easily be held, though not a word was uttered. None of the Indians had a written language; the nearest they came to it was to peck or paint simple pictures on rocks, such as figures of animals and men, hunting or battle scenes, and various devices which had meanings we cannot discover. Many of these "pictographs" were made centuries ago. Some of the Plains Indians, like the Sioux and the Kiowa, kept historical records by painting on a tanned skin symbols of the most important event of each year. These "winter counts" sometimes

A BALL GAME ON THE ICE



Writers of Indian tales have often pictured the redmen as solemn persons who didn't have much fun except when burning a village or taking a scalp. The truth is that among themselves the Indians, when not making war, were fun-loving people. This old drawing shows two teams of braves playing a game from which modern lacrosse originated. It could also be played on land. A round stone was caught up in crook-ended sticks with thongs across the crook, and the object was to throw it through the opponents' goal.

CHIEF LAZY BOY



In his beaded and fringed finery, Chief Lazy Boy of the Blackfeet in Montana is prepared for a fête.

cover several generations. Medicine men, especially among the northern Algonquian tribes, often etched symbolic pictures on birch bark to aid the memory in recalling the order of songs and ceremonies. Wampum belts and strings of shell beads were similarly used by Iroquois and Algonquian tribes. A totem mark was often used as a signature or property mark.

Ceremonial Customs

Indian dances were not performed merely for amusement; nearly always they were the more spectacular part of an elaborate religious ceremony designed to promote the tribal welfare, to increase game or crops, to bring rain, to heal the sick, to bring success in war or to celebrate victory. Every tribe had its own dances and ceremonies suited to its particular needs, and designed to invoke the blessings of its own deities or spirits. These ceremonies often required many days and nights in their performance. They were generally arranged in accordance with ancient custom by a priesthood or a society charged with the religious welfare of the people. Long periods of fasting, vigil, and prayer often preceded them. It has been truthfully said that almost every enterprise was accompanied by invocation or sacrifice, such as casting a bit of food in the fire and uttering a prayer before eating, or puffing smoke or scattering sacred meal to the mysterious powers of the four

A SYMBOLIC PETITION OF CHIPPEWA CHIEFS



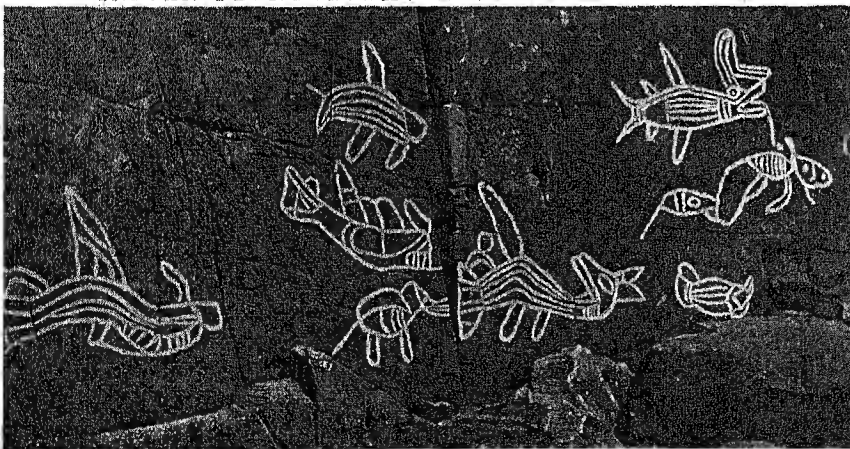
Picture writing is one means of communication among the Indians. The petition illustrated here was presented to the president at Washington on Jan. 28, 1849, by a delegation of Chippewa who wished to regain certain land which they had previously ceded to the United States government. The various animals represented in the picture are the totems of the clans represented by the delegation. The crane is the totem of the chief who led the party, and from his eye and heart many lines are drawn. The lines which connect with the eyes of the fish, the marten, and the other animals indicate that all the other chiefs who are following him see eye to eye with him in this affair; and the lines from his heart to their hearts mean that they have the same feeling about the matter that he has. One line points to Washington, their destination, and another extends to some little lakes beside a river, the spot to which the Chippewa wish to be moved.

winds before undertaking an important task. It is very probable that smoking in former times was never done for pleasure, but was always a ceremonial performance. The Pueblo Indians still believe that by smoking they can induce rain-clouds to come. Some tribes, like the Blackfeet, regard tobacco as so sacred that although they cultivate the plant ceremonially, they do not smoke what they raise.

The Indians who subsisted largely by hunting conducted ceremonies for the increase of game animals and for good luck to the hunters. Those who lived largely by agriculture invoked the powers to produce bountiful crops. In the semi-desert region of the Southwest, especially among the Pueblos, scores of ceremonies were appeals to the gods to produce the

rain without which the people would perish. Today, they believe that feathers have a close relation to the sky regions whence the rains come, and so they attach them to prayer-sticks, which are placed on farms, in shrines, at springs, and along irrigation ditches. The beautiful and graceful Eagle Dance of the Tewa Pueblos symbolizes the powerful bird that soars among the clouds; indeed the downy feathers of the eagle are like the very clouds themselves and are often used in the expectation that real

INDIAN PETROGLYPHS IN BRITISH COLUMBIA



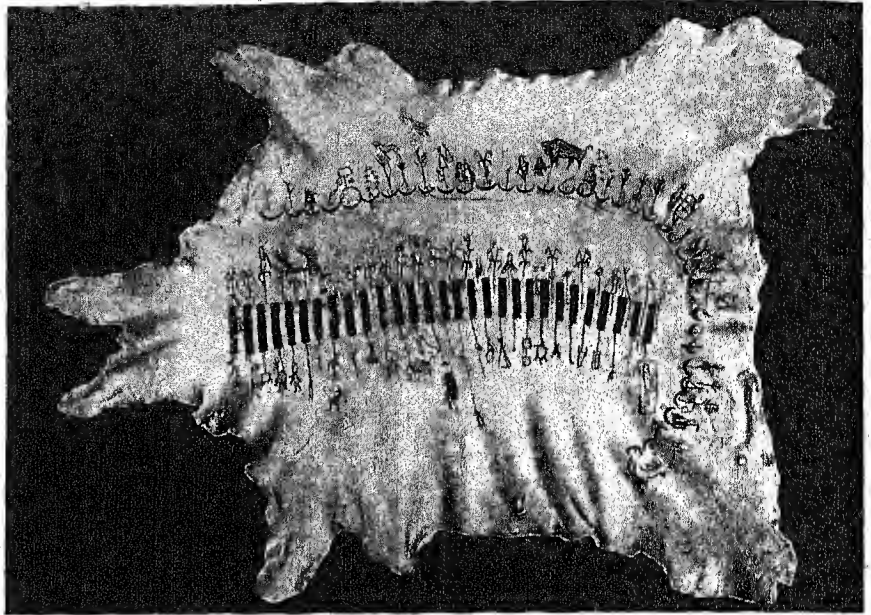
Here is an example of early Indian picture writing which was cut into rocks. The totem of a clan or individual was usually an animal, and it is thought that the animal representations pictured here may have been the forerunners of the wooden totem poles. Early Indian petroglyphs have not been interpreted, but some later ones are fairly well understood.

clouds will gather and rain fall. Snakes and lightning are closely related; hence, the Snake Dance of the Hopi of Arizona, a nine days' ceremony, is an invocation for rain. Among the northern and northwestern tribes the Thunderbird is a mythical creature, the flapping of whose wings creates thunder and which produces lightning by opening and closing its eyes while it releases rain from a lake carried on its back.

It is questionable if in prehistoric times any Indians conceived of one all-powerful deity. The *Máno* of the Algonquian tribes, the *Tiráwa* of the Pawnee, the *Wakanda* of the Siouan tribes, for example, all refer to the mysterious and unknown powers of life and of the universe, rather than to a single "Great Spirit," an idea which was read into supposed Indian belief by early missionaries for want of a better name.

Indian religion involved a belief in a great many spirits, some good, some evil, that dwelt in all animate and inanimate things. To propitiate these was the chief object of the prayers, dances, songs, and sacrifices. Since they believed that the spirits caused

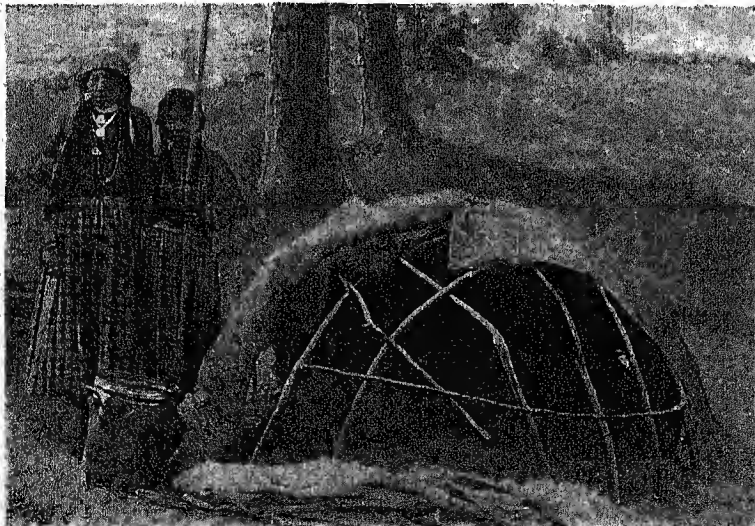
AN INDIAN METHOD OF RECKONING PAST TIME



In this Kiowa buckskin calendar the lunar months from August 1889 to July 1892 are represented by the crescents, while the black oblong marks indicate the winters and the white spaces between them the summers of the years 1865 to 1892. The drawings represent events. The building below the winter of 1875 is Fort Sill, where Kiowa prisoners were brought that year.

trouble, suffering, and death, they said that when a person was ill, a bad spirit had entered into him; and so the Indians had their medicine men and women who claimed the knowledge of gaining power over these evil spirits and driving them away. This was usually done by singing and drumming, uttering magic words, invoking the unseen powers by the use of charms, songs, incantations, and sometimes by the use of medicines, sweating, and blood-letting, the

AN INDIAN CURE OF DOUBTFUL VALUE



The Siwash still cling to the primitive custom of using the sweat hut in the treatment of smallpox and pneumonia. Hot stones are placed in the hut, which is covered to make it air-tight. The patient enters the hut and remains in it until he is drenched in perspiration. He then rushes out and plunges into a very cold stream.

method depending on the character of the ailment. Many of these men and women were serious and honest in their beliefs and practises, though there were charlatans also. (See Magic.) Some Indian medicines are found to have real value. As a rule, however, the colors, shapes, and markings of plants and roots were supposed to indicate the organs of the body for which they were believed to be beneficial. Sweating, followed by a cold plunge, was a very common treatment for many ills.

To all Indians, music was a significant feature of tribal life, for each public ceremony and every important act in the career of an individual had its accompaniment of song. The music of each ceremony and the classes of songs pertaining to individual acts had their own peculiar rhythm, whether

for fasting or prayer, the setting of traps, hunting, courtship, corn grinding, gaming, going to war, returning victorious, facing or defying death, or mourning. Many songs were made up of words, but had only syllables without definite meaning. Group singing was characterized by perfect unison of the performers'

whistles, jinglers made of the dew-claws of deer, and a notched stick over which the shoulder blade of a deer or another notched stick was rasped.

Every tribe had its legends, some more fanciful than true, of the history of the tribe; and when the day's work was done the old people would tell these

THE WINNEBAGO INITIATING MEDICINE MEN



The medicine men formed a sort of secret society, the older members of which initiated the younger ones in the principles of their art. The candidates, who have fasted for several days, are seated at the far end of the long hut. Each old medicine man, carrying his medicine bag, then parades about the hut, making a speech as he goes. After each one has spoken, all mass at one end of the hut and advance upon the candidates, knocking them over with medicine bags. When the candidates rise there is a ceremonial feast and dance, after which they are full-fledged medicine men. Serving as both priest and doctor, the medicine man used magic, prayer, force of suggestion, and a multitude of symbolic means, as well as actual medicine, usually made from roots. He always brought his sacred rattle and his sacred medicine bag to a patient's bedside. In every tribe there were men, and sometimes women, who were regarded as possessing supernatural powers by which they could cure disease.

voices, which had a remarkably long range from high falsetto to a rich basso. Religious songs were handed down from generation to generation, as they were an important part of the ceremonies. The person who made a mistake in singing during a ceremony, was required to commence at the beginning or to perform a rite of contrition before the ceremony could proceed. Women sang songs not only to help their own activities, such as spinning and grinding, but also to encourage the warrior as he went forth.

Every mother, of course, sang lullabys. Birds or animals, in folk-stories, were supposed to sing their own quaint songs, which were imitated by the storyteller. On the northwest coast there were spirited song contests between tribes. Songs were the exclusive property of clans and societies. Individuals, however, could sell their songs or give them away.

Dances were almost invariably accompanied with a drum, the rhythm of which the dance-steps, but not the song, followed. Rattles of gourd, wood, rawhide, turtle-shell, or other material were often carried by the dancers, who were costumed to suit the purpose of the dance. Other musical instruments were flutes,

tales. There were also many stories of animals and mythical beings which could assume human form and yet retain some of their own particular traits. Children were thrilled by these stories.

Disposal of the Dead

The methods of disposing of the dead varied according to the environment and the beliefs of the people, but the custom most commonly practised was that of burial in the ground. Sometimes the grave, oblong or round, was lined with bark or stones and the body covered with logs, stones, or matting. Usually the body was laid on its back in an extended position, but sometimes it was placed on its side with the knees drawn up, or even buried in a sitting posture, as among the Creek and Seminole. The dead were sometimes deposited in fissures in the rocks, or in caves, as in parts of the Southwest; in the latter instance the bodies became thoroughly dried, or mummified, in that arid region, and thus for many centuries have been preserved with their clothing, ornaments, and other belongings. Burials were also made beneath house floors, or the dead were deposited in the houses, which were then torn down or burned over the

remains. On the northern plains and in the upper Missouri River country, a common practise was to place the dead in trees or on scaffolds. On the north-west coast the dead were placed in neat little houses built especially for the purpose and sometimes in

whites; but originally they regarded such concessions as only temporary and often they would ask when the lands were to be returned to them. Such misunderstandings aroused the anger of the tribesmen, and hostilities often followed. Since the natives with their

THE BUFFALO DANCE OF THE MANDAN



The Plains Indians had very elaborate secret societies, which gave their dances in public at stated times. The Mandan Bull Society was the highest organization of this tribe, and only veteran warriors were eligible. These ceremonials greatly impressed the youth of the tribe, each of whom hoped some day to achieve the honor of joining the Bulls.

canoes elevated on posts. Cremation was practised by various tribes from the Pacific coast to Florida; usually the ashes were deposited in pottery vessels and buried. Almost invariably domestic utensils, food, and the ornaments, implements, and other personal belongings of the departed were placed with the remains. In early times the Pueblo people either broke the mortuary vessels in pieces or made a hole in the bottom in order to release the spirit of the receptacle that it might accompany the soul of the dead to the after-world. The grief of relatives of the departed was heartrending and was sometimes emphasized by scarifying the body, blackening the face, and cutting the hair. Some tribes held feasts and dances for the dead. A Chippewa widow carried a bundle representing her husband; and widows among the Athapascans of Canada carried their husband's bones during the period of mourning.

After the White Men Came

Such, briefly stated, were some of the characteristics of the Indians of North America when white men first appeared among them, and later. Contact with the whites, however, did not improve the savage Indian. At first the Indians welcomed them as brothers and received their paints, bright clothes, beads and other trinkets, their wonderful iron tools, and alas, their rum. Ever hospitable when well treated, the Indians were readily wheedled into granting settlement to the

bows and arrows and clubs were no match for the well-armed whites, the redmen usually suffered severe losses, and some tribes in time were exterminated.

The hostility of the redmen was played upon by English, French, and Spanish in their contests for territory. Each side used the Indians to murder its enemies and burn their homes. They paid their allies in trinkets, guns, ammunition, and fire-water. The last was the most effective, for if the Indian was a dread foe when sober, he was doubly to be feared when drunk, for then there was nothing that he would not do. It was for this reason that the United States later made it a crime to take alcoholic liquors into an Indian reservation or to give or sell any to an Indian.

The Indians are often spoken of as a "vanishing race," and it is said that after a time there will be no Indians in America; but this is true only in so far as the pure-bloods are concerned. When the white man first tried to force the Indian to adopt civilized ways, many Indians contracted tuberculosis and many others died of measles, smallpox, and other diseases that were unknown to them before the whites came. War between tribes and with the whites also exacted its toll. However, better living conditions, education, and medical care are now doing much toward overcoming the loss, and in recent years there has been a noticeable increase in the Indian population. It is probable that at the time of the discovery of

America there were about 850,000 Indians in what is now the United States, and about 220,000 in what is now Canada. The present Indian population of the United States (continental) is about 360,000; and Canada's is about 118,000. Not more than half of these are of pure Indian blood. The largest tribe is the Navajo, about 40,000.

Indian affairs are administered by the Office of Indian Affairs of the Department of the Interior. In 1786 the government adopted the policy of concentrating the Indians on reservations. Some tribes were given their original tribal lands while others were moved to the old Indian Territory, now Oklahoma. In 1887 a law was enacted permitting Indians to take up individual land holdings, which they might sell or lease. It was intended thus to gradually absorb the Indian into white man's civilization. This policy was a failure, for in less than 50 years the Indians had lost two-thirds of their land. To remedy this and to provide for general economic and cultural rehabilitation of the Indian, the Indian Reorganization Act was passed in 1934. It prohibits land allotments and the sale of Indian lands except to Indians, authorizes appro-

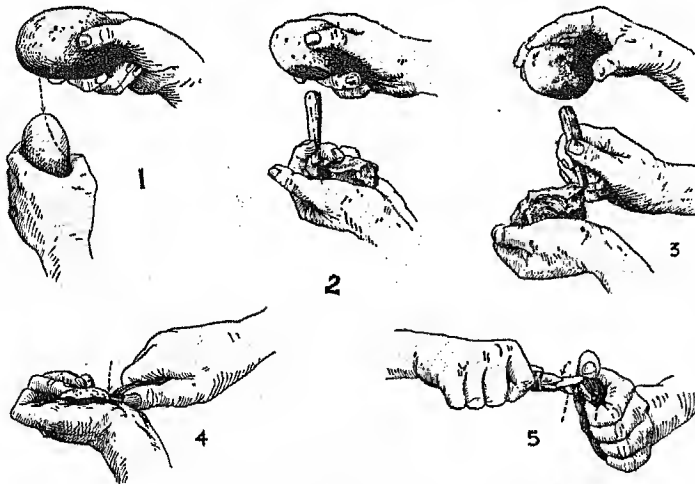
priations for purchasing land for landless Indians, sets up a credit fund, provides for vocational education, and gives the Indians certain rights of self-government and the right to form business and other corporations. Each tribe was given the privilege of voting on whether or not it would accept the act. Indians who were born within the United States were admitted to citizenship in 1924.

In the education

of Indians, efforts are being made to fit both young people and adults to gain a better living and a fuller life through the development of native resources. The government maintains day schools on reservations, which are being made real community centers, and boarding schools, used largely for vocational training. Native arts and crafts, health education, shop work, home making, and agriculture are emphasized.

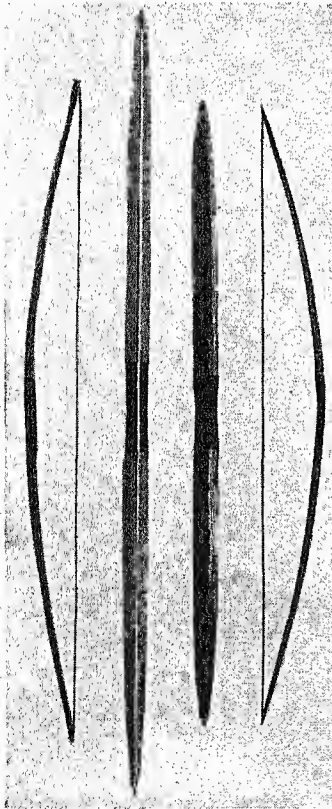
When Indians are given equal opportunity with their white brothers to develop freely, they show fine intellectual traits. Many of them have risen to high places in the ministry, in law, in medicine, and in political and military affairs. The higher their position, the greater pride they take in their race — a just pride for, though overcome

MAKING ARROW-HEADS OF STONE



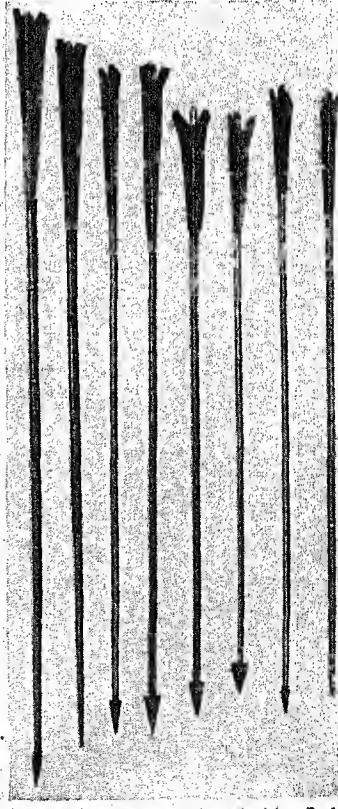
Before the white man came, the Indians of North America made their arrow-heads as here illustrated: 1. Shaping a stone by hammering it with another stone. 2. Fashioning finer work with the aid of a stone "chisel." 3. A more delicate task requiring the aid of an assistant. 4 and 5. Finishing the edges by chipping and flaking away the rough places with "pliers" made of bone.

INDIAN BOWS



1. Hickory bow, a strong-shooting bow. 2. Ash bow. 3. Yew bow, backed with tendon. 4. Yew bow, rawhide back.

INDIAN ARROWS



Bow and arrow were the primitive Indian's chief weapon of the chase. Arrows as well as bows were of various types.

A POTLATCH CELEBRATION AMONG THE YUKON INDIANS



When a wealthy Indian wished to encourage the friendship of members of his own or other tribes he often held a *potlatch*, meaning "free gifts," a colorful ceremony accompanied by dances and songs and beating of the tom-tom, at which the host gave away most of his possessions. Custom required, however, that the recipients return gifts triple in value. Potlatches are discouraged by the United States and Canadian governments and are now seldom held.

in physical conflict with the white man's civilization, the spirit of that race was never conquered.

Some Famous Indian Wars

The earliest notable conflict with the Indians in New England was the Pequot War of 1637-38. This was soon ended by one bold stroke of the English settlers, who carried the Pequot camp by storm and massacred its inhabitants. In 1675 the very existence of Plymouth was threatened by King Philip's War, when the coast Indians formed a great confederation to drive the whites from the continent. For nearly two years, until the death of their leader, "King Philip," in 1676, there were frightful massacres.

Numerous conflicts occurred from 1689 to 1763, in which the English, aided by the Iroquois, fought the French and the Algonquian Indians (see French and Indian War). After the overthrow of the French in America, the Ottawa chief Pontiac, organized an attack on all the 14 British garrisons and settlements in the West. He had earlier led his people at the time of Braddock's defeat (1755), and cherished an abiding hatred for "those dogs in red." In many places the Indians were successful, but at Detroit, where Pontiac commanded in person, they were forced after five months to raise the siege (October 1763). In 1765 Pontiac concluded a treaty of peace with the English, and in 1769 he was murdered at Cahokia, Ill., by a Kaaskaskia Indian.

During the American Revolution the Indians, with the exception of a few tribes, took the part of England against the colonists, largely because of the old alliance with the Iroquois. Immediately before the War of 1812 Tecumseh, a Shawnee leader, tried to confederate the southern and western tribes against the whites, but this was frustrated by the battle of Tippecanoe (see Tecumseh). Other Indians aided the British in the War of 1812. In the South the powerful Creek Indian confederacy, whose tribes held a large part of Georgia and Alabama, captured Fort Mims on the Alabama River and massacred 400 men, women, and children (Aug. 30, 1813). Gen. Andrew Jackson finally crushed them at Horseshoe Bend (March 29, 1814). Later there were troubles growing out of the attempt to remove them to Indian Territory (now Oklahoma), but in 1836 Gen. Winfield Scott reduced them again to submission. About 25,000 were then removed to the Indian Territory reservation west of the Mississippi.

In 1831 Black Hawk, chief of the Sauk (Sac) and Fox began the Black Hawk War as a result of disputes over the

cession of Indian lands in Illinois. Driven back over the Mississippi River by a force of Illinois militia, he returned in 1832 and renewed his attacks on white villages. The war was brought to an end by his surrender in August.

While still under Spanish rule, the Seminole Indians in Florida were steadily hostile to the United States. They took part in the War of 1812. In the First Seminole War waged in 1817-18, the Indians were quelled by a force under Gen. Andrew Jackson. In 1835, the Seminoles under the leadership of Osceola repudiated the treaty by which they had agreed to vacate Florida. The Second Seminole War (1835-42) was the result. It cost the lives of nearly 1,500 American troops and an expenditure of \$10,000,000. The massacre of Maj. F. L. Dade's command of 100 men was one of the bloody incidents of this war which resulted in the expatriation of most of the Seminoles from Florida.

When white American settlement advanced beyond the Mississippi the ancient struggle with the aboriginal possessors of the soil was renewed. From 1860 the Apache terrorized the region of New Mexico and Arizona, burning towns and slaughtering whites, often in retaliation for atrocities committed against them by frontiersmen. The last hostile band under Geronimo surrendered in 1886.

Equally formidable opposition to the white man's advance in the Northwest was offered by the great Sioux chief, Sitting Bull. During the Civil War he led bands to attack settlements in Iowa and Minnesota, but in 1864 he and his people were driven into the country of the Big Horn and Yellowstone rivers. From 1869 to 1876 he was continuously on the warpath. On June 25th of the latter year, the attempt of Gen. G. A. Custer with 208 United States army troopers to force him to return to his reservation failed, and Custer and his whole force were trapped and massacred. After five years of precarious refuge beyond the Canadian border, Sitting Bull accepted an offer of pardon from Gen. N. A. Miles and returned to United States territory. He steadfastly opposed the cession of further Indian lands to the whites, and when a "Messiah Craze" broke out among the Sioux in 1890, a warrant for the arrest of Sitting Bull was issued. Police, instead of soldiers, were sent to his camp to arrest him. This aroused so much resentment among his followers that they attempted to rescue him. In the ensuing confusion, Sitting Bull, unarmed and in the hands of the police, was killed. His young son also was shot. Soon after, an Indian camp was surprised by cavalry and destroyed in the battle of Wounded Knee.



LITTLE EAGLE-HEART and His Sister LAUGHING-WATER



YOU are proud of being an American boy, aren't you? Perhaps you will be surprised to learn that there is another boy who has a better right to the name than you have. He was here more than 400 years ago, when Columbus sailed across the wide ocean and found our country.

This American boy was tall and straight and slender. His eyes were as black as ink, his hair as black as a crow's wing. He could run like a deer, swim like a fish, and climb like a squirrel. He was as solemn as a little owl. When he grew to be a man he wore a head-dress of eagle feathers. His skin was not white, like yours. It was very nearly the color of an English penny or an American one-cent piece. Now you know what he was. He was an American Indian. There are still a great many Indians in our country. Most of them live in houses, or on farms. They dress like white boys, speak English, and go to school. But their faces are the same as those Columbus saw.

It was a hard wild life the Indian boy lived. Still, he had a good deal of fun. It was like camping out

all the time. There were about a million Indians here, and the country was so big that there was room for everybody to move about a good deal. There were no cities or farms, no railway trains or wagons, no horses even or cattle. Dogs were their only tamed animals. The Indians had to travel on foot. They followed narrow paths, or trails, through the forests and over the plains. On the rivers and lakes they made long journeys, in boats so light that they could carry them on their shoulders from one stream to another. These boats, called canoes, were made of birch bark stretched over frames of wood. A great many Indians traveled together, for company and for safety. Each band was called a tribe and each had a chief. When a tribe of the Great Plains, for example, found a good place to camp, the tent poles were placed in a circle, brought together at the top, and covered with skins of large animals, like buffalo or elk. This tent is called a teepee (tipi) from its Sioux name. Other Indians built dome-shaped houses of bark or mats, called wigwams; still others made long bark-covered houses.

Our little Indian boy was born in a wigwam, in a village of other wigwams in the forest. His mother put a long shirt of soft yellow deerskin on him, and taught him his first lesson before he was a day old. She taught him that he must not cry. When he cried she put her hand over his mouth. She did this because cruel enemies and wild animals might hear him. When he grew up he could bear any pain without complaining.

The Indian baby could not even kick. His mother bound him to a flat piece of birch bark, to make his



Eagle-Heart learned the "moose call" that brought the big bull moose within range of his swift arrow.

back and legs straight. She hung "the baby and cradle and all" from her shoulders. She wrapped a big skin around herself and the baby, if it was cold

weather, leaving his face uncovered so he could see. Then they went "by-by." Any baby would like that. When the tribe stopped to rest, the baby and his cradle were hung from the limb of a tree, and the wind rocked him to sleep.

AN INDIAN MAID'S TASK



"Laughing-Water had to help scrape the hair from deer-skins with sharp clam shells and rub and pull the skin until it was as soft as a kid glove."

Someone was always saying "don't" to the Indian boy and girl. "Don't make a noise when you walk. You must not even rustle a leaf, or snap a twig." That might scare away the deer father was trying to kill, and then the family must go hungry.

Sometimes, when out hunting, a boy had to lie for an hour, as quiet as pussy at a mouse-hole. The Indian boy had to learn to make fire by twisting a pointed stick rapidly in a groove in another stick. He had to learn to make a bow and a stone arrow-head; to make a canoe and snowshoes. He shot arrows at a mark every day; he speared fish, and learned to use a stone hatchet, called a "tomahawk." He must be able to tell what kind of weather was coming, and know the ways and places

and calls of animals and birds, and be able to follow the tracks of men and wild beasts. He had to learn how to fight, too, or he and his family would be killed. The Indian boy was grown to a man before he had learned all his lessons.

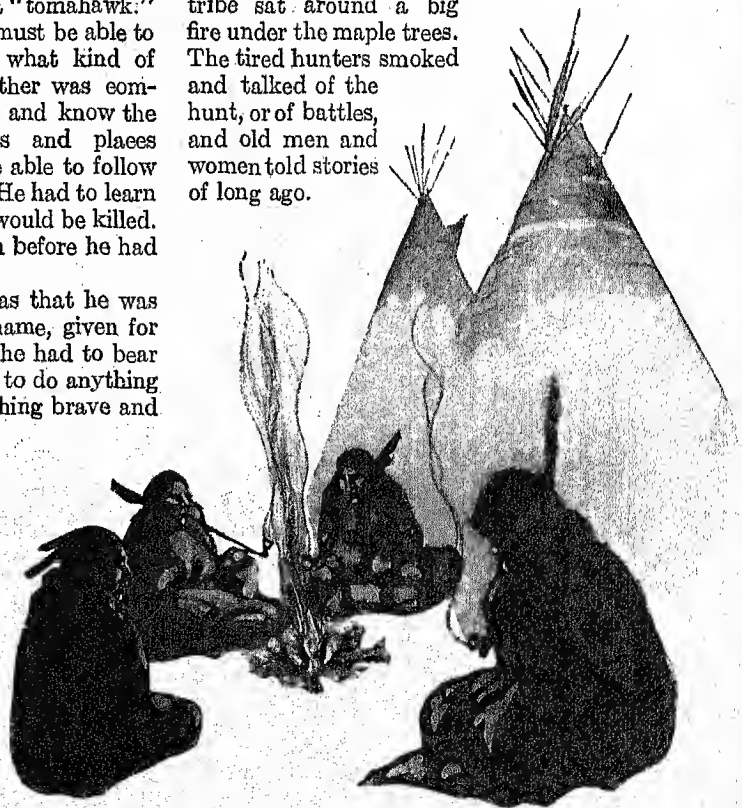
One sign that he had grown up was that he was given a name. It was really a nickname, given for something he had done. This name he had to bear all his life, so he was very careful not to do anything foolish or cowardly. If he did something brave and got such a name as Eagle-Heart, he was so proud he couldn't sleep the first night. The Indian man was proud and brave and cunning. Sometimes he was cruel. No man could use him for a slave.

If Eagle-Heart's sister was a merry little maid she might be called Laughing-Water. Isn't that a pretty name? Laughing-Water had lessons to learn too. She had to help her mother take the skins from the wild animals the hunters brought home, and cut up and

cook the meat. She had to help scrape the hair from deerskins with sharp clam shells, and rub and pull the skin until it was as soft as a kid glove. A needle she made of a fish bone; for thread she used the leg tendons of the deer. Her thread was like our violin strings. It was very strong. Then she sewed the skins into shirts and leggings and moccasins and robes. She embroidered moccasins and belts with little shells, after boring holes through them; and she colored porcupine quills and arranged them in patterns on the soft yellow skin. She colored long eagle feathers and made a warrior head-dress for her father. She made herself necklaces of shells.

In the summer, the Indian women and girls dug holes in the fields, with pointed sticks or clam shells, and planted corn and beans, pumpkins and tobacco. Laughing-Water had to gather the ripe corn, shell it, boil the grains in clay pots, dry them and pound them to meal in wooden bowls. She sifted the meal through a sieve she made of fine tough grass. She wove baskets of reeds and grasses. If she had time she wove colored figures and lines in her pretty baskets. She made clay cooking pots and water jars, and she painted figures on them. One of the nicest things she did was to make candy. She made it by boiling the sweet sap of the maple tree. For her father, Laughing-Water dried the broad tobacco leaves. He put these in a pipe with a stone bowl and a hollow reed stem, and smoked them.

In the evening the whole tribe sat around a big fire under the maple trees. The tired hunters smoked and talked of the hunt, or of battles, and old men and women told stories of long ago.



INDIGO. For centuries the much-prized blue dye called indigo was obtained exclusively from the indigo plant, and the indigo trade with India and other centers of production was flourishing and prosperous. Today the natural indigo trade has dwindled to a fraction of its former importance as the result of the discovery of means of making artificial indigo.

The story of artificial indigo is one of the most interesting in the history of chemistry. It took 17 years of tireless experiment and the expenditure of nearly \$5,000,000 to perfect the process. As early as 1880 a German chemist, Adolf von Baeyer, produced synthetic indigo from coal-tar products, but the cost of production was much greater than that of the natural dye. From then until 1897 he and others worked on the problem of making indigo by less expensive processes, and finally succeeded in producing it at less than half the cost of the plant dye. There is still a steady demand for the natural indigo, when certain "fast" blues are wanted. (See Dyes.)

Most vegetable indigo comes from a shrubby plant three to five feet high, with rounded leaves and pale red flowers, belonging to the bean family. When three months old and in blossom, the plants are cut down, but soon shoot up again, and yield a second and often a third cutting in one year. The cut stems and leaves are crushed and soaked in water for several hours. Fermentation takes place. Then the water, which is clear yellow, is run off into another vat and stirred. Indigo begins to form in bluish flakes on contact with the air and settles. It is filtered through linen, molded into small cakes, and dried for shipment.

The best quality comes from Bengal. Indigo plants are also grown in Java, China, Ceylon, Mexico, Brazil, and Central America, and for a time there were extensive plantations in South Carolina and other Southern states. Scientific name of Bengal indigo plant, *Indigofera sumatrana*. In China an indigo dye is obtained from a plant known as *Polygonum tinctorium*.

INDIVIDUAL DIFFERENCES. The eminent naturalist, Charles Darwin, spent his life in a search for variations. He knew the importance of differences between individual and individual and between species and species in the world of plants and animals. Psychologists today seek and measure differences in human traits because this has a practical bearing on education and other important social aspects of human life.

Through the study of individual differences we can best obtain the material for com-

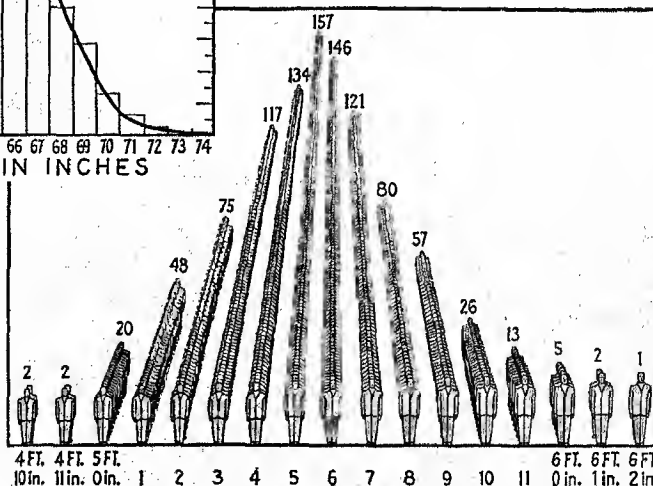
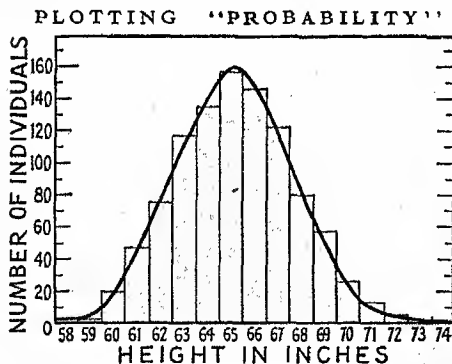
paring groups. It used to be taken for granted that boys had greater mental ability than girls, and that men were superior in intelligence to women. But when numerous individuals were tested one by one with respect to their mental ability, and the measurements carefully analyzed, it became clear that the old opinion was unfounded. (See Intelligence Tests.)

Furthermore, only by studying differences can we fully understand the individual himself. For example, great athletes are those who better the records made by others. The achievements of individual athletes must be compared before we can pass judgment on the performance of any particular one.

The idea of observing how individuals differ is, therefore, nothing new. Everyone has been doing this since the dawn of history—but in a crude, haphazard way. In the scientific study of this problem, strict mathematical and statistical methods are used, and accurate measurements substituted for guesswork.

The modern study of individual differences has produced important results. By focusing attention on the individual, it teaches schools the necessity of special provision for the extremely bright child, for the extremely retarded child, and for the children who show talents of various sorts. In vocational guidance and in industry it leads to the placing of individuals in the kind of work for which analysis of their traits shows them to be best fitted. It helps to break down prejudice by demonstrating that there is very little if any difference in mental ability between the sexes, or in natural gifts between average people of various races and nationalities.

Let us inspect some of the mathematical methods commonly used in this study. Here is a regiment of men. Suppose we arrange them in parallel ranks or classes according to height in the manner shown in the diagram herewith.



Immediately above is a regiment of men arranged so that the front rank has the smallest man at the left and the tallest man at the right, and behind each man in the front rank, are all the others of the same height. The number in each file is given beside it. The smaller picture shows the same facts diagrammatically, also the "probability curve" described in the text.

Immediately we notice that more men are clustered around the middle of the series than at the ends. At a glance we can pick out the "minimum" or shortest class, the "maximum" or tallest class, and the "mode" or class with the most members.

A line connecting the tops of the columns would give us a curve like that accompanying the diagram. From the mode, or highest point of the curve, the numbers in each class fall away gradually to either side until the limits of the series are reached. This type is called a *normal curve*, or, since it illustrates the distribution of chance phenomena (occurrences equally likely to happen or not to happen), it is also termed a *probability curve*. No matter what individual differences are measured, whether they be the length of the leaves of an oak tree, the weight of each potato in a field, or the marks of 1,000 freshmen in college, if these measurements are plotted on a chart, the same sort of curve is almost always obtained.

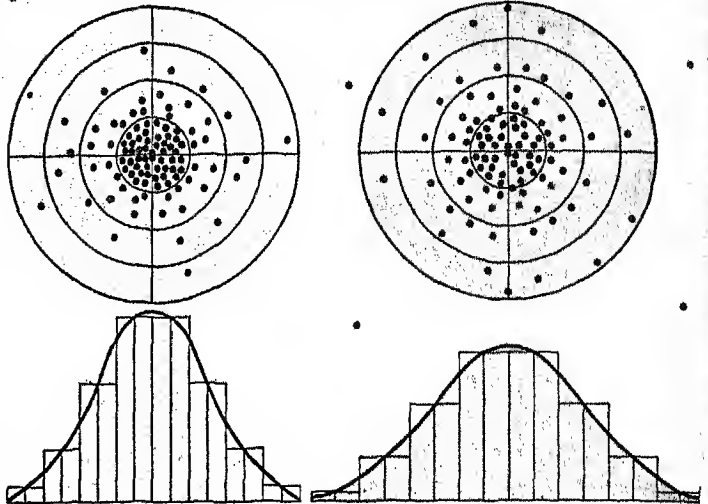
For convenience, we shall dismiss this regiment and continue our study with a group of 12 boys selected at random. Of these 12, we find one, let us say, measuring 60 inches in height; one measuring 61 inches; two, 62 inches; two, 63 inches; three, 64 inches; two, 65 inches; and one, 66 inches. Their combined height is 750 inches, and this divided by the total number of boys gives 5 feet $3\frac{1}{4}$ inches (63.25 inches) as their *average* height.

We can compare two groups of people by their averages. If we find that the average height of 16-year-old boys is 5 feet $5\frac{1}{2}$ inches, while the average height of 16-year-old girls is 5 feet $3\frac{3}{8}$ inches, we are justified in saying that 16-year-old boys are, on the average, $1\frac{1}{8}$ inches taller than girls of the same age.

To find out how greatly certain individuals differ from their group average, we simply find the difference between each individual's measurement and the average of the group. If this is done for every member of the group, and these variations from the general average are added together and divided by the total number of cases, then we have obtained the *mean variation*. The mean variation of the selected group of 12 boys is $1\frac{5}{8}$ inches, as you can readily see by making the necessary computations.

It is important to know the mean variation as well as the average, since two groups of people may differ from each other not only in their general average, but also in the amount of scattering or "spread" of differences around the average. Thus, in one school-room all the children have grades between 75 and 90, while in the other room many of the grades are almost perfect, others very poor, yet the average mark attained by each class might be the same.

WHY AVERAGES OFTEN ARE MISLEADING



The targets above show substantially what would happen if two groups of marksmen, one more skilled than the other, fired one hundred shots at their respective targets. The more skilled group (left) would bunch its hits better, the curved line below indicating the number of hits in each hundred shots to be expected on each portion of the target. Note the smaller number to be expected at each distance from the less skilled group, also that some of its shots miss altogether. Yet if each group were "averaged" crudely by median lines dividing the shots equally between right and left, and above and below, the bull's-eye, these lines would intersect in the same place for each group—on the bull's-eye. Superior skill of the left-hand group is indicated by the "greater expectancy" of shots near the bull's-eye, and the narrower "dispersion zone" of all its shots.

A similar case is represented by the diagram showing the target scores made by two groups of marksmen. You can see how a tall curve results from plotting the scores of a group whose mean variation is small, while the low curve represents a group whose mean variation is great. The average, however, is the same for both.

Everyone has observed that two kinds of individual differences often appear to go hand in hand. So we hear someone remark that fat people are generally jolly, or brunettes are more intelligent than blondes. When scientists try to discover relationships between varying factors, they call the process *correlation*. But since science must be exact, a scale is needed to indicate the precise degree and nature of the relationship. This is expressed in figures ranging from -1.00 through $.00$ to $+1.00$. If there is no relation between traits, a figure near $.00$ is obtained; if there is a close relation a figure near $+1.00$ is obtained; and if there is an inverse relation, a figure near -1.00 is obtained. Thus $+.60$ would mean a fair degree of relationship, $+.09$ would mean almost no relationship, and $-.89$ would mean that every time one trait increased, there was a decrease in the other.

The correlation between height and weight for people above 16 years is between $+.60$ and $+.70$, indicating that usually the taller people are the heavier people. If it were $-.60$ it would indicate that the taller you are the lighter you are, which is obviously untrue. Nevertheless, there are some tall people who are light in weight and some short people who are heavy. If this were not so, the correlation would be near $+1.00$.

Statistical studies dispel many popular beliefs. We often hear that people in poor health tend to be unusually bright, or that a child, poor in one study, tends to be good in another. Actually, good health and brightness in all subjects usually go together.

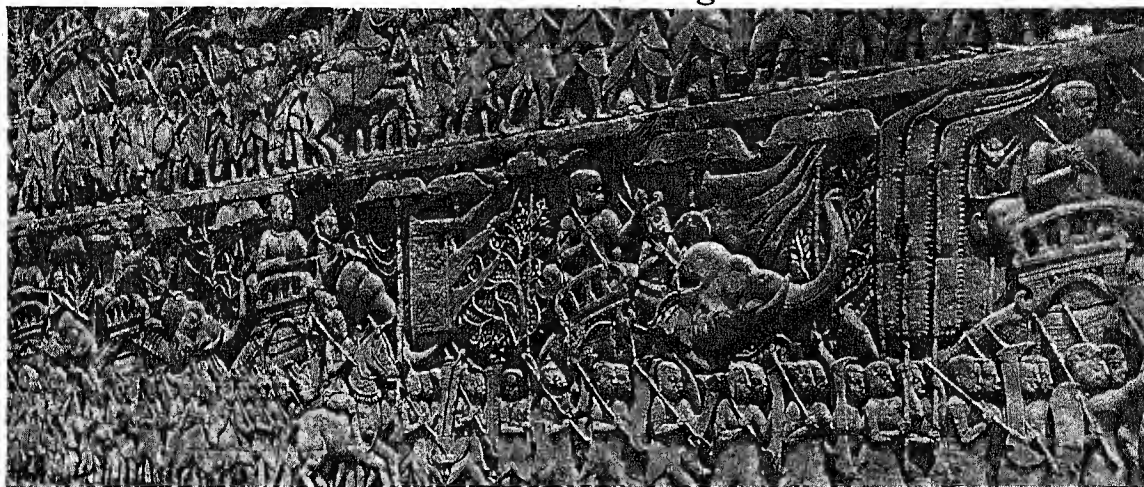
Such studies have also shown how closely near relatives resemble one another. The correlation in mental and physical traits between

Twins of the same sex is.....	+.70 to +.90
Twins of unlike sex.....	+.60
Brothers and brothers.....	+.50
Brothers and sisters.....	+.50
Children and parents.....	+.30
Children and grandparents.....	+.15
Children taken at random.....	.00

Careful studies have also shaken the common belief that physical races and peoples of different nationalities have different mental characteristics. Experimenters have found very little difference between any two races or nationalities in keenness of sight or hearing, speed of reaction to a signal, or other simple traits. The differences which we notice are in education, culture, and habits of thought.

Large groups also differ less from one another than do the individuals within each group. Thus Indians as a group are not so good as whites in school; but many whites fail to equal the average Indian and some Indians surpass the average of the whites. (*See also Anthropology; Biometry; Child Development.*)

ASIA'S Rich Southeastern Finger—INDO-CHINA



For more than a thousand years these fine carvings have ornamented the temple of Angkor Wat in Cambodia. They show scenes, done in the Indian style, from the religion and history of the Khmers, who occupied the region when the temple was built.

INDO-CHINA. The name Indo-China suggests a meeting or a mingling of India and China. And that, in fact, is what Indo-China is. Almost from the beginnings of civilization, the southeastern peninsula of Asia has been a meeting ground for Hindus and Chinese. "Farther India" it used to be called, but the name Indo-China is better.

Several mountain ranges which slope southeast from the Himalayas make Indo-China a bridge between these two vast regions. One of these ranges extends like a long tendril as the Malay Peninsula. Others divide the land into valleys, with deltas at the river mouths. Protected by these mountains, the valley peoples escaped conquest by their great neighbors.

But they did receive a constant trickle of population, particularly from China. And from both neighbors they took their arts and industries. Hence today we find the Hindu temple near the Chinese pagoda, Chinese plows used to cultivate rice by Indian methods, and many other minglings of Hindu and Chinese.

The Land and the People

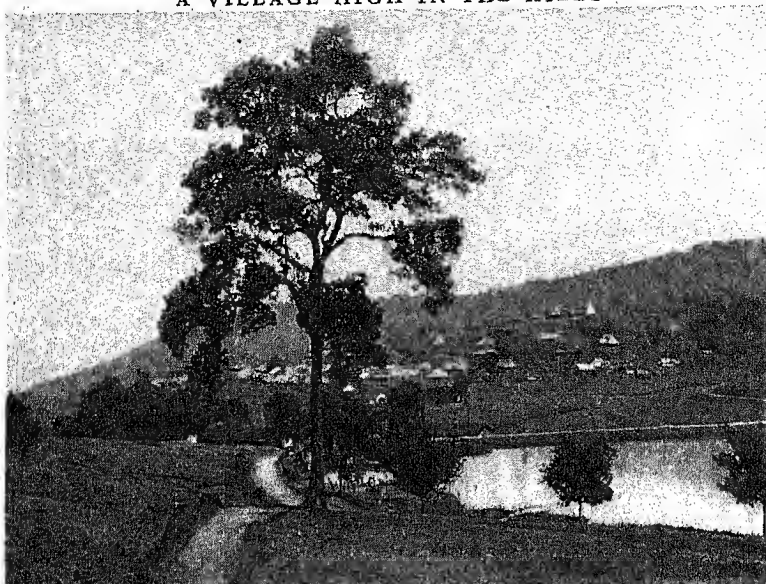
The peninsula lies inside the tropics and has a monsoon climate. But its range of altitude—from sea

level to mountain heights—gives a wide variety of temperature, rainfall, and plant life. Tropical trees and plants flourish in the hot, rain-drenched southern coastal regions and the flooded river plains. Yet some inland regions are virtual deserts. The high hills and mountains have frosts and cool-climate oaks and even evergreens.

In normal times the region is the world's largest exporter of rice, its chief source of tin and rubber, and a rich source of petroleum. Untapped mineral deposits and forests, new crops, and new industries await development. Most of the people are still rooted to the land as peasant farmers, with very low standards of education and living. Industry is little developed. Until war struck in 1942, both industry and commerce were almost entirely controlled by Chinese, Indians, whites, and other aliens.

The people are as varied as the land. The chief groups are the Burmese, Thais, Malays, Annamese, and Cambodians, with smaller numbers of Shans, Chins, and Kachins. Immigration has brought large numbers of Chinese and Indians. Important trade cities have a sprinkling of Europeans.

A VILLAGE HIGH IN THE HILLS



This village high on the Shan Plateau, near the Burma-Thailand border, has a temperate-climate look, except for the steep thatched roofs. The dry climate of the region and the elevation of 5,600 feet keep plant life down to a thin scattering of growth.

Until the European nations seized most of the peninsula during the 19th century, it was divided into many petty kingdoms. Today it consists of four countries—French Indo-China, Burma, British Malaya, and Thailand. Together these countries have a total area of about 790,000 square miles and a population of about 57,000,000. Thus Indo-China is nearly half as large as India, but it has less than a sixth of the population. (For details about countries other than French Indo-China, *see* Burma; Malay Peninsula; Thailand.)

The Seat of French Empire

Nearly a third of the peninsula is occupied by French Indo-China, with an area of about 260,000 square miles—about as large as Texas. The backbone of French Indo-China is the Annam Cordillera. This extends from a knot of mountains in the northwest to the seacoast near Vinh. Then it runs as a rocky rampart along the China Sea to end between Phanrang and Saigon. The country lies between the Tropic of Cancer and 10° north latitude, or about the same as the stretch from Tampico in Mexico to Panama.

The northwestern and west central parts correspond to the old state of Laos. The seacoast portion is the old state of Annam. In the northeast, a stretch of hilly country and the rich delta of the Songkoi, or Red River, slope from the Annam range to the Chinese border. This region is the old state of Tonkin. In the southwest a still broader delta stretches toward a knobby upland region on the Gulf of Siam. The delta is Cochinchina; the uplands roughly constitute Cambodia.

Over all these regions sweep the seasonal monsoons, giving them their climate and plant life (*see* Winds). The summer monsoon blows from the southwest from mid-April to October, bringing drenching rain to the regions southwest of the Cordillera, and a dry season along the China Sea. From October to April the northeast monsoon blows from the China Sea, and the seasons are reversed. On the lowlands the mean temperature is well above 80° or even 90° F. in summer and below 70° in winter. On mountain heights it may fall below 50° or even to nearly 40°. There fires are welcome at night, and frosts occur. Thundershowers and, on the east coast, typhoons provide moisture even in the dry season.

Plant and Animal Life

The abundant rain and heat prevailing throughout Indo-China

tend to cover the entire land with a tropical forest of Asiatic trees, except for subtropical growth on the higher mountains. The many kinds of palms include the coco, nipa, and rattan. Timber trees include teak, ebony, and rosewood. Lac, gamboge, strychnine, and chaulmoogra are other forest products. Mulberry trees provide for silk growing. Swampy areas support

PREPARING RICE IN CAMBODIA



To clean rice, these natives pound off the hulls from the natural grain, or paddy, with a mortar and pestle. Then they sieve out the clean grain.

mangrove forests, and bamboo flourishes on all the higher, drier soils.

Animal life includes a rich array of forest birds, insects, and reptiles; in Annam crocodiles are used as food. The forests have tigers, elephants, rhinoceroses, panthers, bears, and monkeys. In the mountains are boars, deer, leopards, buffaloes, and small wild horses. The rivers abound in food fish, including the six-foot pa-loun.

A Peasant People

The native peoples are basically Mongoloid in race with strong strains of Malay and Hindu. The more important differences among them arise, not from race, but from location and from their past contacts.

The Annamese of Tonkin and Cochin-China make up about four-fifths of the population. They are short and slender, but with heavy, flat faces. Their writing and customs resemble those of China. The Chams of south Annam show a mixture of white blood, in part from Hindu settlers. The Khmers or Cambodians of the southwest are a puzzling mixture of white and Mongolian. The impressive ruins in the region, especially at Angkor Thom, tell of a vanished high culture of the Hindu type. Scattered among these peoples are Malays, Thais or Siamese, and many Chinese.

Most of the people are peasants, farming small plots near their villages. Only about a twelfth of the total land area is cultivated. More than half is mountainous, and easily four-fifths of the people are crowded into parts of the lowlands where river floods give ample water for rice growing. Nearly a third are massed on the rich Red River delta, working farms of less than an acre. Here population may be as dense as 2,500 persons to the square mile.



This map shows how Indo-China consists of mountain ranges, packed closely together in the north, and fanning out somewhat in the south. The longest range extends far beyond the others into the sea, as the long, tendril-like Malay Peninsula.

Population becomes less dense as the peninsula stretches southward. But the peasants dislike to migrate, even to the better lands of the more thinly settled Mekong delta and Tonlé Sap, the "Great Lake" fed by the Mekong in north central Cambodia.

Homes, Clothes, and Lives of the People

In most native villages the houses rest on piles to stand above the seasonal river floods. Pigs, chickens,

THE FOREST CONQUERS THE WORKS OF MAN



In the tropical forest, ceaseless effort is needed to keep nature from overwhelming even buildings of stone. Here the octopus-like roots of a fig tree have surmounted an abandoned temple and reared a forest giant over ancient ruins.

and water buffaloes are kept below. Mats or slatted curtains hung from bamboo framework make the walls. The roof is palm-leaf thatch. The well-to-do use teak for timber and have tiled roofs. Furniture consists of mats, boxes, and utensils, arranged in one large room and tiny bedrooms.

Men and women dress alike. When at work, they may wear only baggy trousers or a square of cloth draped as a skirt. Otherwise, they wear a shirt, a knee-length tunic, or a narrow scarf draped around the shoulders or body. Their hats are usually made of palm leaf, shaped like a large parasol or flat and braced with bamboo to carry tea and other loads. This broad, light headgear gives protection against sun and rain. A favorite ornament is an array of brass rings around the neck, wrists, or ankles.

Rice and fish are the chief foods. Corn, millet, beans, sweet potatoes, palm sugar, and some cane sugar are also grown. The chili peppers of Cambodia and Cochin-China are prized for the hot, evil-smelling *nuoc mam*, a sauce made from fish, used daily.

This drab life is colored by traces of the elaborate artistry brought in centuries ago. The simple dress of the Cambodians is of brilliant hues; and their temple dances, performed in gorgeous costumes, are like the famous dances of India. In Tonkin, gems and metals and vivid embroideries are worked with the delicate skill characteristic of southern China. And in Tonkin and Annam even the poorest people carefully make miniature bright garments, horses, and other

"worldly riches" out of paper to accompany the spirits of their relatives.

Agriculture, Trade, and Industry

About five-sixths of the land is devoted to growing rice. So much of Tonkin, which raises two crops a year, and of Cochin-China is thus planted that they have been called "two baskets of rice hung on the carrying pole of Annam." Tonkin and Annam also raise silk. Foreign-owned plantations in Cochin-China produce rubber, coffee, tea, and some sugar cane. In Cambodia rice shares importance with palm sugar and with fishing, especially on Tonlé Sap. This lake may rise to more than 40 feet at flood time and increase its area from 1,000 to 9,000 square miles.

About half of French Indo-China's export trade is in rice. Most of it is sent from Cochin-China, for crowded Tonkin needs most of its own huge crop. Other major exports are rubber, corn, coal, tin, tungsten, and other minerals. The chief imports are textile fabrics, petroleum products, iron and steel, raw cotton, and machinery. Before the outbreak of the second World War this trade

was chiefly with France, the British Empire, China, Japan, the Philippines, and the United States. Japan took large quantities of rice, corn, and coal, iron, and other minerals.

Mining is an important occupation in Tonkin. This rugged region has most of the mineral resources. It has large deposits of high-grade anthracite coal. It also has iron, manganese, zinc, lead, graphite, phosphates, tungsten, gold, silver, and some tin. Laos, Annam, and Cambodia also have some mineral wealth. Nearly half of the country is forested, but timber is cut on only about a third of the forest land, chiefly in Laos. Teak is the leading timber, and bamboo is widely used.

Manufacturing consists largely of refining native raw materials. Rice milling is most important; other products are silk, cotton goods, glass, cement, vegetable oils, matches, and paper from bamboo. Most of the industries are located in Tonkin.

Cities and Transportation

The seat of government for French Indo-China is Hanoi. It is built somewhat like a French city, with shaded boulevards and landscaped parks, bordered by brick buildings. Its port, Haiphong, is the industrial and commercial center. It lies at the entrance of the Bay of Along, which is a "prank of nature," filled with rocky islands weathered into odd shapes like castles, bridges, and grotesque animals.

Saigon, capital of the protectorate of Cochin-China, is also Parisian in plan and architecture, with European shops and sidewalk cafés. Situated on the Sai-

gon River and linked with the Mekong by canal, it is a world port. With its large Chinese suburb, Cholon, it is the chief city of French Indo-China. Pnom-Penh on the Mekong is the capital and trade city of Cambodia. Hué, capital of Annam, is small, but it is a royal city of palaces and imposing tombs.

French engineers have built a fine network of all-weather highways to link the principal cities. There are more than 22,000 miles of roads, many of them carrying motorbus lines. An outstanding engineering feat is the extension of the ancient Mandarin Road from the Chinese border through Hanoi and along the entire coast to Saigon and west through Pnom-Penh to Thailand. Rivers are still the chief means of travel on the flood plains. Ocean steamers can ply the Red River as far as Laokay and the Mekong to Pnom-Penh. River steamers can follow the Mekong as far as Vientiane. About 2,000 miles of railroads link the chief cities.

French Indo-China, especially Cambodia, is a rich source of archeological treasure. The vast ruins of Angkor Thom, a magnificent walled city north of Tonlé Sap in Cambodia, are among the marvels of the world. The city was built by the Khmers in the 12th century and seems to have been abandoned three centuries later, when the Thais of Siam broke the power of the Khmer kings.

Among the impressive ruins is the temple of Bayon, with a high central tower and 50 small, ornamental ones. The red-roofed temple Angkor Vat was built to honor Buddha. A motor road has made the ruins accessible. Yellow-robed priests serve again in its chapels, and dancers trained from childhood perform the intricate figures carved on ancient friezes.

Government and History

French Indo-China consists of the colony of Cochin-China, the protectorates of Annam, Cambodia, Tonkin, and Laos, and the small district of Kwangchowan, leased from China in 1899. All are administered by a governor general sent from France. Annam and Cambodia are under direct rule of native kings, as is the Luang Prabang kingdom in north central Laos. Little progress has been made in public education, and much remains to be done toward improving public health, especially in rural regions. There is a small university at Hanoi, established in 1917. Its principal function has been to train Annamese students as assistants to French officials, and provide general education for planters and businessmen.

French interest in this region began as early as 1663, when missionaries pushed eastward to Cambodia. A treaty with Cochin-China in 1787 paved the way for conquest in the 19th century. Cambodia became a French protectorate in 1863, Tonkin and Annam in

A TONKINESE STYLE IN HATS



This broad, flat hat of cunningly worked palm leaves is shaped for keeping off sun and rain, and yet is light to wear.

1884, and Laos in 1893. Annexation of Cochin-China as a colony, begun in 1862, was complete in 1867. After the defeat of France in 1940, during the second World War, Japan forced the cession of air and naval bases. The next year Thailand invaded the border

region and won about 25,000 square miles in Laos and Cambodia by a settlement mediated by Japan. This was followed by defense pacts which enabled Japan to occupy Indo-China, ostensibly as a precaution against attack from China. Thus Japan was in an excellent position to strike at once through Thai-

land into Malaya and Burma when it attacked Great Britain and the United States late in 1941. (See also World War, Second.)

INDUS RIVER. Glacier-born amid the wind-swept wastes of Tibet, this is one of the three great rivers of India. It rushes for the first 500 miles of its 2,000-mile journey through an array of majestic Himalayan peaks of unequalled grandeur. After flowing northwestwardly through Kashmir it bends to the southwest and presently emerges into the great Indian plain of the Punjab, the "land of the five rivers."

FACTS ABOUT FRENCH INDO-CHINA

Extent.—North to south, about 1,000 miles; east to west, about 575 miles before territorial grants to Thailand. Area, about 284,000 square miles before grants to Thailand (about 25,000 square miles). Population, about 23,000,000.

Climate.—Monsoon type. Annual precipitation on central coast, 100 inches. Temperatures: in dry season, south, 68°–80° F., north, 95° extreme; in wet season, south, 93° extreme, north, 43°–75° F.

Cities.—Saigon (with suburb Choien, 255,000) Hanoi, (capital, 150,000), Binh-Dinh (145,000), Pnom-Penh (105,000).

Leased Territory.—Kwangchowan: area, about 325 square miles; population, about 220,000.

The united flood of the six rivers now sweeps on through Sind plain—a region which is the creation of the Indus as Egypt is the creation of the Nile. The climate here is almost rainless, but thanks to the annual inundation of the great river, when the melting snows of the Himalayas cause it to burst its banks, and to an intricate network of canals and irrigation ditches, all this region produces abundant crops of cotton, millet, rice, and wheat.

Even the soil is the gift of the river, which carries the fine sand and clay of its upper course to the Sind plain and deposits the silt there as it slackens its impetuous course. So abundant is this accumulation

that the Indus has raised its bed 70 feet above the level of the plain.

In the lower part of its course, except where it runs between walls of rock, the river continually shifts its bed, especially in the 130-mile delta, through which it finds outlet to the Indian Ocean by means of a great number of little channels. Hence there is little navigation, except by the high-sterned flat native boats. Fish are abundant and crocodiles and alligators infest the lower reaches. The river is crossed by many bridges. In some places one finds the primitive swaying rope and vine bridges of the mountaineers, while in others there are modern steel suspension railway bridges.

How MACHINES Changed Man's WAYS of LIVING

INDUSTRIAL REVOLUTION. About the time of the American Revolution, the people of England began to use machines to make cloth, and steam engines to run the machines. They also found better ways to smelt iron and to transport goods. These changes and the many other changes connected with them have so revolutionized our ways of living that we call them the Industrial Revolution. Beginning in England, this revolution in industry—

which is still going on—gradually spread throughout Europe, the United States, and Canada. Asia has been far behind in adopting the new ways. In Japan, the Industrial Revolution did not begin until 1870—a century later than in England—and in China it is only now beginning.

The most important of the changes that brought this revolution about are: (1) the invention of machines to take the place of hand tools; (2) the use of steam power, and later electric power, in place of the muscles of human beings; and (3) the adoption of the factory system.

Picture what the world would be like if the effects of the Industrial Revolution should be swept away. Our electric lights would go out, and we should have flickering candles instead. Automobiles and airplanes would vanish, and with them railroads and steamships as well as telephones and radios. The children of all but the rich would have little or no schooling and would work from dawn to dusk on the farm or in the home. For before machines were invented, the business of providing food, clothing, and shelter required the labor of children as well as of adults.

Why We Call It a "Revolution"

Some historians think that the group of changes that we commonly call the Industrial Revolution has no

DOWN through the ages men dreamed of wealth that should come by magic and not by work. For thousands of years nobody did much about it except to turn the dreams into fairy stories—the Magic Carpet, Aladdin's Lamp, or the Seven-League Boots. Finally, out of the daily effort of simple men, these dreams slowly grew into realities. Weavers, mechanics, merchants, and scientists have created a world that surpasses the most fantastic fairy tale ever told. We sail through the air in luxurious airplanes that make the magic carpet seem drafty and slow. Untouched by human hands, doors open as we approach and close behind us without even a rub on the lamp. Voices come to us clearly from the other side of the earth. Wealth in a thousand forms, such as clothing, books, furniture, and motor cars, is created for us by servants of steel more powerful than any genie. How machines have transformed the world of yesterday into the world we know is largely the story of the Industrial Revolution.

right to be called a "revolution." To them these recent developments seem only a speeding up of changes which had been going on for centuries. But there are two reasons why these changes in industry are generally considered worthy of the name "revolution." The first is their far-reaching importance, and the second is the comparative rapidity with which they came about. Tools and methods of manufacture which existed in 1770 had

taken a long time to develop. It had taken the human race thousands of years to learn to make stone tools, then tools of copper and bronze, and finally of iron. Changes in manufactured products had been equally slow. In the tombs of ancient Egypt we find linen—made 3,000 years ago—which is much like the linen that was still being laboriously woven by hand in 1770. There is good reason, then, for giving the name "revolution" to these changes which have so completely altered our industrial world in a century and a half, even though they came about very gradually compared to political revolutions like the American Revolution and the French Revolution.

The Industrial Revolution began in England about 1770 with the invention of textile machinery and the steam engine. Just why it came about then and there we can understand only if we look at the conditions of industry and commerce at that time.

1. Industry on the Eve of the Revolution

COMMERCE and industry have always been closely related. Sometimes one is ahead and sometimes the other, but the one ahead is always speeding up the other. Beginning about the year 1400, commerce grew and changed so greatly that we sometimes use the term "Commercial Revolution" to

describe the economic developments of the next three and a half centuries. Many things helped to bring about this revolution in trade. The Crusades opened up the riches of the East to Western Europe. America was discovered and the European nations began to acquire rich colonies. New trade routes were discovered (*see Commerce*). The strong central governments which replaced the feudal system began to protect and help their traders. Trading companies, such as the British East India Company, were chartered by governments (*see East Indies*). Larger ships were built and flourishing trade cities grew up.

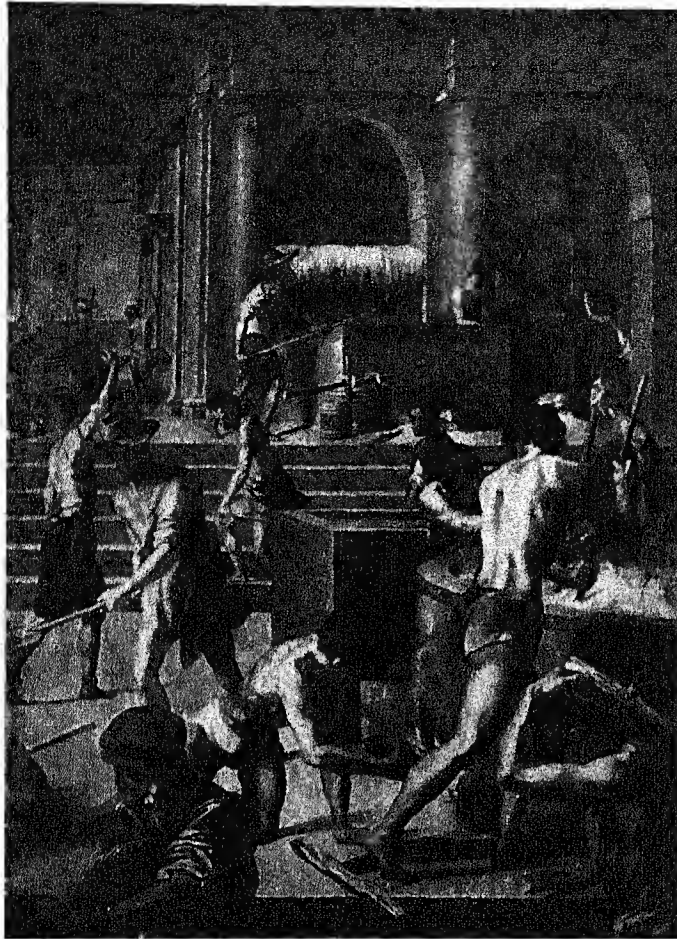
With the expansion of trade, more money was needed, because large-scale trading could not be carried on by barter, as much of the earlier trade had been. Gold and silver from the New World helped to meet this need. Banks and credit systems developed. By the end of the 17th century Europe had a large accumulation of capital. And with the growth of capital, trade expanded still further, and new capital was available for new ventures. This had to happen before machinery and steam engines could come into wide use, because these devices are costly to manufacture and instal.

By 1750 large quantities of goods were being exchanged among the European nations, and there was a demand for more goods than were being produced. England was the leading commercial nation, and the manufacture of cloth was England's leading industry. It was therefore natural that the new methods of making goods should have originated in England, and in the English textile industry.

How Production Was Organized

Several systems of producing goods had grown up by the time of the Industrial Revolution. In country dis-

ITALIAN CLOTH FACTORY—16TH CENTURY



Factories or central workshops like this existed long before the beginning of the Industrial Revolution, but they were few. The widespread adoption of the factory system, with machines run by mechanical power, was one of the most significant changes of the late 18th century.

tricts families produced most of their food, their clothing, and the other articles they used, just as they had done for centuries back. In the cities merchandise was made in shops much like those of the medieval craftsmen, and manufacturing was strictly regulated by the guilds and by the government (*see Guilds*). But the goods produced in these shops, though of high quality, were limited in amount and costly. The merchants needed cheaper goods, as well as larger quantities, for their growing trade. So as early as the 15th century they had begun to go outside the cities, beyond the reach of the hampering regulations, and to establish another system of producing goods.

Putting-Out System

Cloth merchants, for instance, would buy raw wool from

the sheep owners, have it spun into yarn by farmers' wives, and take it to country weavers to be made into cloth. These country weavers could weave the cloth more cheaply than city craftsmen could because they got part of their living from their gardens or small farms. From them the merchants would then collect the cloth, and give it out again to finishers and dyers. Thus they organized and controlled cloth making from start to finish. Similar methods of organizing and controlling the process of manufacture came to prevail in other industries, as, for example, making nails, cutlery, and leather goods.

Some writers call this the Putting-out System. Others call it the Domestic System, because the work was done in the home ("domestic" comes from the Latin word for home). Another term is Cottage Industry, because most of the workers belonged to the class of farm laborers known as cotters, and carried on the work in their cottages.

This system of industry, though it seems clumsy to

COTTAGE INDUSTRY IN 18TH-CENTURY ENGLAND



The production of woollen goods gives employment to all the members of this English family. The mother and the daughter spin and wind the yarn while the father knits stockings on his stocking frame. (From an engraving in the *Universal Magazine*, London, 1750.)

us, had several advantages over older systems. It gave the merchant a larger supply of manufactured articles at a lower price. It also enabled him to order the particular kinds of articles that he needed for his markets. It worked to the advantage of the craftsman, too, since it provided employment for every member of the family, and also gave employment to craftsmen who had no capital to start businesses for themselves.

Infant Factories

A few merchants who had enough capital had gone a step further, bringing workers together under one roof and supplying them with spinning wheels and looms, or the implements of other trades, as well as with materials. These establishments were factories, though they bear slight resemblance to the factories of today. They were more like enlarged shops of the craft guild masters.

Why the Industrial Revolution Began in England

To sum up, here are some of the reasons why the Industrial Revolution began in England instead of somewhere else, and why it began when it did: English merchants were leaders in developing a commerce

which cried out for more goods; trade had enabled these merchants to accumulate capital to use in industry; and a cheaper system of production had grown up which was largely free from regulation.

In addition to these commercial advantages, there were new ideas in the air, especially in England, which aided the movement. One of these was the growing interest in scientific investigation and invention. Another was the doctrine of *laissez-faire*, or letting business alone—a doctrine which had been growing in favor throughout the 18th century, but especially after the British economist Adam Smith argued powerfully for it in his great work 'The Wealth of Nations' (1776). For centuries the guilds and the government had regulated commerce and industry down to the smallest detail. By the time the Industrial Revolution began, many Englishmen had come to believe that it was better to let business be regulated by the free play of supply and demand rather than by laws. So the English government for the most part kept its hands off and left business free to adopt the new machines and the methods of production best suited to the machines.

2. Beginnings of the Industrial Revolution—about 1770-1840

THE MOST IMPORTANT of the machines which ushered in the Industrial Revolution were invented in England during the last third of the 18th century. But three inventions had been made earlier in the century which opened the way for the later machines. One was the crude, slow-moving steam engine built by Newcomen in 1705, which was used to pump water out of mines. The second was Kay's flying shuttle (1733), which enabled one man to handle a wide loom more rapidly than two persons could operate it before. The third invention was a spinning frame for spinning cotton thread with rollers, first set up by Paul and Wyatt in 1741. Their machine was not commercially practical, but it is significant as the first step toward solving the problem of machine spinning. (See Spinning and Weaving.)

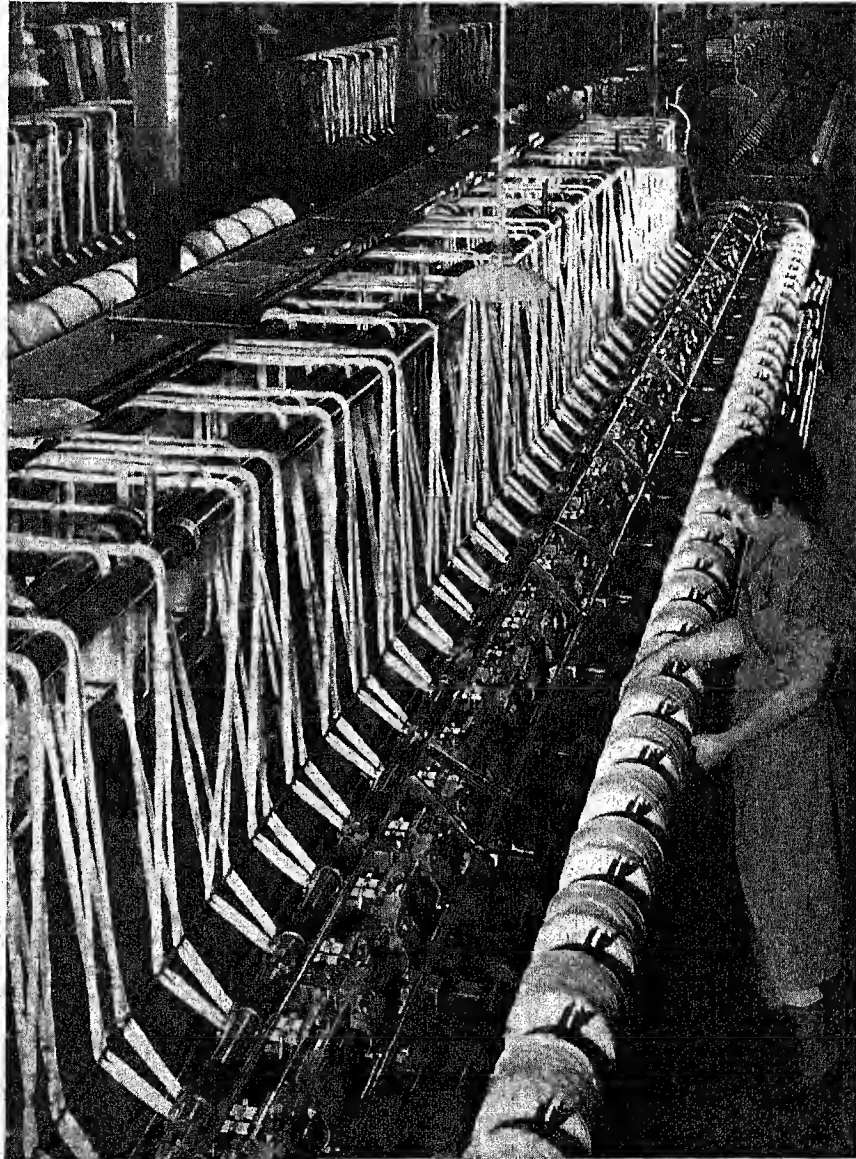
Inventions in English Textile Industry

As the flying shuttle speeded up weaving, the demand for cotton yarn increased; and many inventors set to work to improve on the spinning wheel. Among them was a weaver who was also a carpenter, James Hargreaves. After working on his invention for several years, he patented his spinning jenny in 1770. This enabled one workman to run eight spindles instead of one. About the same time Richard Arkwright developed his water-frame, a machine for spinning with rollers operated by water power, which he patented in 1769. In 1779 Samuel Crompton, a spinner, combined Hargreaves' jenny and Arkwright's roller frame into a spinning machine, called a "mule." The mule produced thread of greater fineness and strength than either the jenny or the roller frame. Since the roller frame and the mule were large and

heavy, it became the practise to instal them in mills, where they could be run by water power and tended by women and children. (See Arkwright, Richard; Crompton, Samuel; Hargreaves, James.)

These improvements in spinning machinery in turn called for further improvements in weaving. In 1785 Edmund Cartwright patented a power loom. In spite of the need for it, weaving machinery came into use very slowly. First, many improvements had to be made before the loom was satisfactory. Second, the hand weavers violently opposed its use, because it threw many of them out of work, and those who got

FACTORY PRODUCTION TODAY



Power-driven machinery does the work in this modern woolen mill, where one young woman can take the place of a hundred hand operators. And we do not find the yarn and the stockings being made under one roof today, for the Industrial Revolution brought a high degree of specialization.

jobs in the factories were obliged to take the same pay as unskilled workers. So they rioted, smashed the machines, and tried to prevent their use. The power loom was only beginning to be widely used in the cotton industry by 1813, and it did not completely replace the hand loom in weaving cotton until 1850. It was still not well adapted to the weaving of some woolsens and as late as 1880 many hand looms were still in commercial use for weaving woolen cloth. (See Cartwright, Edmund.)

Many other machines contributed to the progress of the textile industry. In 1785 Thomas Bell of Glasgow invented cylinder printing of cotton goods. This was a great improvement on block printing because it made successive impressions of a design "join up," and did the work more rapidly and more cheaply. In 1793 the available supply of cotton was increased by Eli Whitney's invention of the cotton gin (see Whitney, Eli). In 1804 J. M. Jacquard, a Frenchman, perfected a loom on which patterns might be woven in fabrics by mechanical means. The Jacquard loom was afterward adapted to the manufacture of lace, and what had been the luxury of queens became available to everybody (for pictures, see Lace; Silk).

Watt's Steam Engine

While textile machinery was developing, progress was being made in other directions. In 1763 James Watt, a Scottish mechanic, was asked to repair a model of a Newcomen steam engine. As he worked on it he saw how crude and inefficient it was, and by a series of improvements he made it a practical engine for running machinery. Water wheels turned by running streams had been the chief source of power for the early factories, and so factories were necessarily situated on swift running streams. When the steam engine became efficient, it was possible to locate factories in more convenient places. Water power, however, was still used to a large extent and the use of the steam engine spread slowly. (See Steam Engine; Watt, James.)

Progress in Coal and Iron Production

The first users of steam engines were the coal and iron industries, which were destined to be basic industries in the new age of machinery. As early as 1720 many steam engines were in use. In coal mines, they pumped out the water which usually flooded the deep shafts. In the iron industry, they pumped water to create the draft in blast furnaces. Iron benefited from several other early inventions of the 18th century. Iron was scarce and costly, and production was falling off because England's forests could not supply enough charcoal for smelting the ore. Ironmasters had long been experimenting with coal as a fuel for smelting. Finally a family of ironmasters, the Darbys, after three generations of effort, succeeded in using coal transformed into coke (see Coke). This created a new demand for coal and laid the foundation for the British coal industry. But the iron produced by coke smelting was too brittle for many purposes. The next great step was taken in 1784 when Henry Cort and Peter Onions developed the process of puddling and rolling,

which produced nearly pure malleable iron. (See Iron and Steel.) Hand in hand with the adoption of the new inventions went the rapid development of the factory system of manufacture.

Growth of the Factory System

The factory system made goods more plentiful and cheaper, and thus improved people's ways of living. It also brought about widespread changes in the lives of the workers. The use of machinery made it possible for manufacturers to employ unskilled workers to produce merchandise which in earlier times required the skill of men who had spent years learning their trade. Thus, while the factory system opened up opportunities for unskilled workers, it brought great hardship to skilled craftsmen. Hence the craftsmen opposed the introduction of the machines, wrecked mills, and persecuted the inventors.

Summary of the Period 1770-1840

The years between 1770 and 1840 might be called the first period of the Industrial Revolution in England. Some writers have called it the Age of Wood, because coal and iron and steel were still far from plentiful. In this period the first necessary inventions were made and improved, the factory system was extended, and transportation and commerce were being adapted to distribute the increasing quantities of goods produced by the new methods. Agriculture, too, was going through so many changes that we often hear of an "Agricultural Revolution" that paralleled the Industrial Revolution. And these changes had their effect on the new age of industry (see Agriculture).

After the early inventions the chief technical advances were a steady improvement in iron and steel making, in coal mining, and in the steam engine. These advances were of fundamental importance because they provided cheaper metal, cheaper fuel, and cheaper power for all types of manufacturing.

3. Changing Economic, Social, and Political Conditions in England

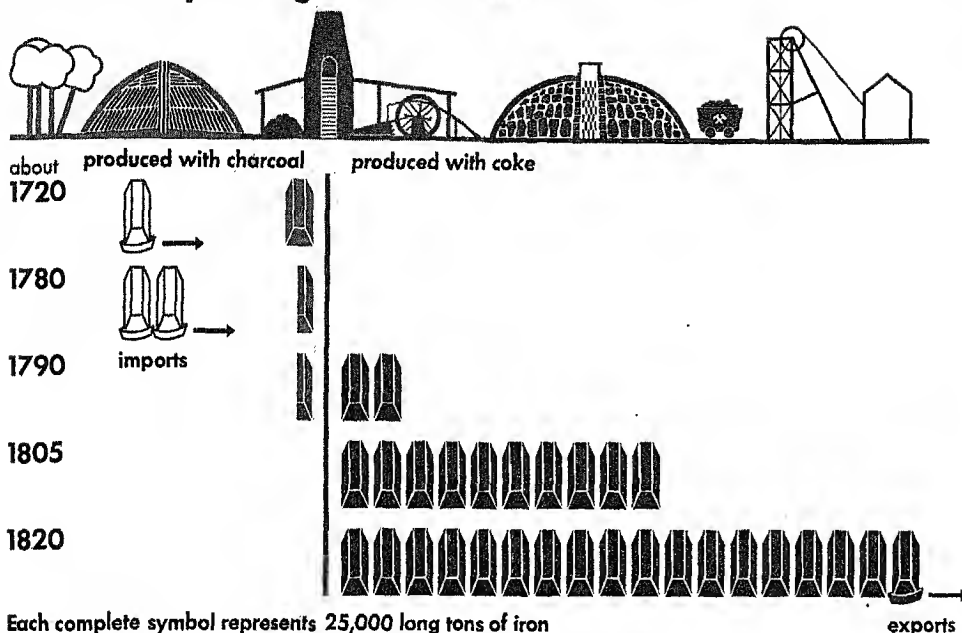
IT IS EASY to see how the new methods increased the amount of goods produced and decreased the cost. The spinner at a machine with 100 spindles on it could spin 100 threads of cotton more rapidly than 100 spinners could on the old spinning wheels. Southern planters in America were able to meet the increased demand for raw cotton to keep these spinners busy because they were using the cotton gin, which could do the work of 50 men in cleaning cotton. Similar improvements were being made in other lines of industry. British merchants no longer found it a problem to obtain enough goods to supply their markets. On the contrary, at times markets were glutted with more goods than could be sold. Then there was a "business depression"; mills were closed and workers were thrown out of employment.

Progress in Transportation

With English factories calling for supplies, such as American cotton, from a distance, and sending out goods to all parts of the world, better transportation

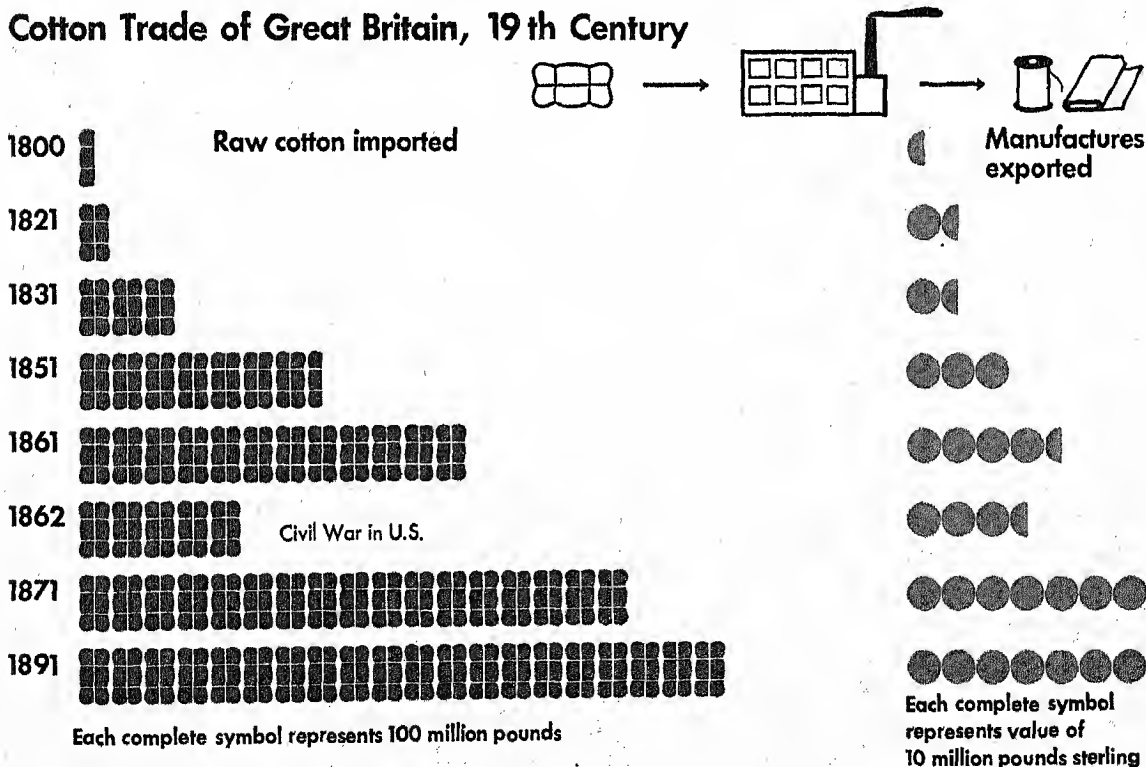
Iron Industry in England 1720-1820

Prepared for Compton's
Pictured Encyclopedia
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tion for Visual Education



With the Industrial Revolution, the whole picture of England's iron industry changed. In 1805 English industries used four times as much iron as they had used 15 years earlier. Fortunately improvements in mining and smelting methods made possible greatly increased production. The chart shows that in 1720 England, using charcoal as a fuel, produced only half the iron it used. By 1780 with the forests fast dwindling, it had to import four-fifths. Then, as coke replaced charcoal, the fuel problem was solved. By 1820 English ironworks had a surplus for export. (Data from Cunningham's 'Growth of English Industry and Commerce'.)

Cotton Trade of Great Britain, 19th Century



The dramatic growth of Great Britain's cotton trade in the 19th century is shown by this chart, which gives data for representative years. Notice that imports of raw cotton doubled between 1800 and 1821, tripled in the next decade, and more than doubled again in the years between 1831 and 1851. The Civil War in the United States cut off most of the American imports in 1862, but in less than a decade they had jumped to more than twice the quantity imported in 1851. At the right you see how the value of cotton goods exported increased from £5,000,000 (\$25,000,000) in 1800 to £70,000,000 (\$350,000,000) toward the close of the century. (Data from Usher's 'An Introduction to the Industrial History of England'; 'Statistical Abstract of the United Kingdom'.)

Movement of Population from Country to City

United States

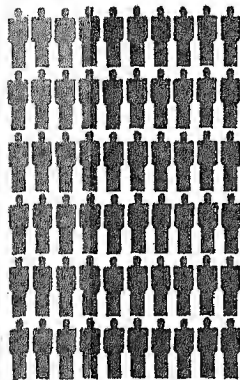
1800



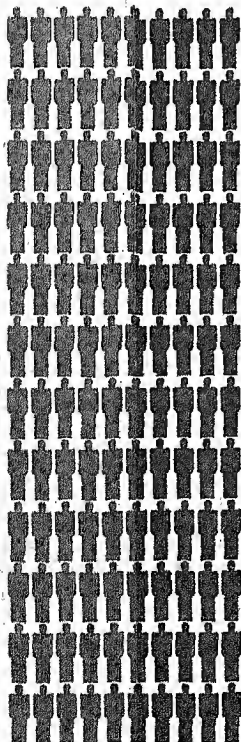
1850



1890



1930

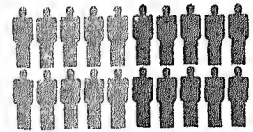


England and Wales

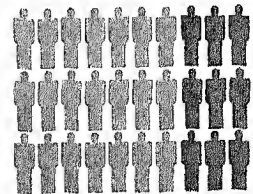
1800



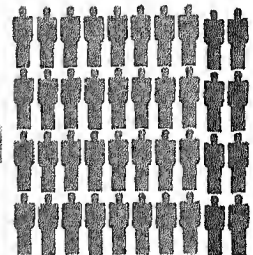
1850



1890



1930



Each complete symbol represents 1 million population
red: urban green: rural

Prepared for Compton's Pictured Encyclopedia
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Not only did population increase rapidly during 130 years of industrial change, but cities grew far more rapidly than rural areas as people left their farms to join the army of factory workers. In 1930 the population of the United States was 24 times as large as in 1800, and 55 per cent of the people lived in cities, as against 10 per cent in 1800. The 1930 population of England and Wales was four times that of 1800, and the percentage of urban population had increased from about 30 per cent to 80 per cent. (Data from 'Statistical Abstract of the United States' and British census reports.)

was needed. The roads of England were wretchedly poor and often impassable. Pack-horses and wagons crawled along them, carrying small loads. Such slow and inadequate transportation kept the cost of goods high. Here again the need produced the invention. Two men, Telford and MacAdam, each developed a method of road construction better than any that had been known since the ancient Romans built their famous roads. Many canals were dug, connecting the main rivers and so furnishing a network of waterways for transporting coal and other heavy goods. A canal boat held much more than any wagon and moved smoothly if slowly over the water, with a single horse hitched to the tow line. In some places, where it was impossible to dig canals and where heavy loads of coal had to be hauled, mine owners laid down wooden or iron rails. On these early railroads one horse could haul as much coal or stone as 20 horses could on ordinary roads. Early in the 19th century Stephenson's locomotive and Fulton's steamboat, an American invention which England adopted, marked the beginning of modern transportation methods on land and sea. Railroads, in turn, called for the production of more goods, for they put factory-made products within reach of many more people at prices they could afford to pay. (See Canals; Railroads; Roads and Streets; Ships; Transportation.)

Increase in Population and Growth of Cities

As conditions in industry changed, social and political conditions changed with them. Farm laborers and artisans flocked to the manufacturing centers and became industrial workers. Cities grew rapidly in population and the percentage of farmers in the total population declined. The population of England as a whole began to increase rapidly after the middle of the 18th century. Because of progress in medical knowledge and sanitation, fewer people died in infancy or childhood, and the average length of life increased.

The Condition of Labor

Far-reaching changes were gradually brought about in the life of the industrial workers. For one thing, machines took a great burden of hard work from the muscles of human beings and enabled one man to accomplish the work which would before have required 10 or 100. Compare, for example, digging a cellar with a spade and doing the same job with a modern steam shovel.

Some of the other changes, however, were not so welcome. The change from domestic industry to the factory system meant a loss of independence to the workers. The home worker could work when he pleased. Though the need for money often drove him to work long hours, he could vary the monotony by digging or planting his garden patch. When he became a factory worker he not only had to work long hours, but he had to leave his little farm and live near the factory, often in a crowded tenement district. He also had to work continuously at the pace set by the machine. And especially for the women and children who soon became tenders of machines in the facto-

ries, the long hours and the monotonous toil were a great hardship.

The change was particularly hard on the weavers and other skilled workers who sank to the position of factory workers. They had been independent masters, capitalists in a small way, and managers of their own businesses. They had pride in their skill. When they saw themselves being forced into factories to do other men's bidding for the pay of unskilled workers, it is no wonder that they rioted and broke up looms.

As the Industrial Revolution spread into one field after another, craftsmen in each field were forced either up or down the social scale. The more gifted and ambitious became managers, chemists, engineers, and the like. The others were reduced to the level of unskilled workers or were thrown out of work altogether. A few of the skilled workers who had business ability and enough capital set up factories themselves, but they were the exception, not the rule.

The Growth of Capital

A man had to have considerable capital to buy machines and open a factory. But those who were successful made large profits with which to buy more machines, put up larger buildings, and purchase supplies in larger quantities at great savings. Thus capital increased far more rapidly than it ever had before. Much of it was invested in building canals, railroads, and steamships, and in developing foreign trade. The men who controlled these various enterprises formed a new and powerful class in England—the industrial capitalists. (See Economics; England.)

Problems of Capital and Labor

Both the capitalists and the industrial workers faced serious problems as the new order developed. The capitalists had a struggle to obtain a voice in the government. They needed a better system of banking, currency, and credit. They had to find markets for their products and hold them. They also had many difficulties in organizing their factories to run efficiently. And they had to make a profit on their investments in the face of intense competition.

Now that *laissez-faire* was the rule in England, and government had accepted the doctrine that it should keep hands off business, factory owners could arrange working conditions as they pleased. And here arose grave problems for the workers—problems of working hours, wages, unemployment, accidents, employment of women and children, and housing conditions.

Children could tend most of the machines as well as older persons could, and they could be hired for less pay. Great numbers of them were worked 12 or 14 hours a day under terrible conditions. Many children were apprenticed to the factory owners and housed in miserable dormitories. Ill-fed and ill-clothed, they were often driven to work under the lash of the overseer. The high death rate of these child slaves roused Parliament in 1802 to pass a law limiting the daily work for apprentices to 12 hours and requiring that they be taught reading, writing, and arithmetic. In 1833 another law extended protection to all children.

and to women. (See *Factories and Factory Laws; Child Labor Laws; Employers' Liability.*)

Workmen sought to win improved conditions and wages through labor unions. These unions often started as "friendly societies" to which the workers paid dues, and which extended aid during illness or unemployment. Soon, however, they became organizations for winning improvements by collective bargaining and strikes (see *Labor*).

Industrial workers also sought to benefit themselves by political action. They became interested not only in fighting such laws as the English laws of 1799 and 1800 forbidding labor organizations, but also in securing laws which would help them. This led to the formation of labor parties and to the socialist movement (see *Labor Parties; Socialism*). The struggle by workers to win the right to vote and to extend their political power was a major factor in the spread of democracy during the 19th century.

4. Spread of the Revolution to Other Countries—1770-1840

DURING THE PERIOD 1770-1840 the Industrial Revolution spread to France, Belgium, and the United States. Until 1815 France was so busy with the Napoleonic wars that it had little opportunity to introduce machinery. When peace came, France began to follow England. It followed slowly, however, and has never devoted itself so exclusively to manufacturing as England has. Much of the wealth of France still comes from agriculture and those industries which are carried on at least in part by hand, wherein the skill and taste of the artist craftsman are important factors. Belgium was ahead of France in adopting the new methods, but the other countries of Europe lagged far behind, making comparatively little progress until the second half of the 19th century.

Why Manufacturing Lagged in the United States

The United States, too, was slow in adopting machine methods of manufacture. Farming and trading were its chief interests until the Civil War. The new nation had little capital with which to buy the machinery and put up the buildings required; and such capital as existed was largely invested in shipping and commerce. Labor was scarce because men continued to push westward, clearing the forests and establishing themselves on the land. The huge areas of fertile land in the west opened to settlement after the Constitution was adopted gave added impetus to farming.

A start in manufacturing, however, was made in New England in 1790 by Samuel Slater. An employee of Arkwright's spinning mills, Slater came to the United States in 1789 and was hired by Moses Brown of Providence, R. I., to build a mill on the Pawtucket, or Seekonk, River. Though English laws forbade export of either the new machinery or plans for making it, Slater was able to design the machine from memory and build a mill which started operation in 1790. Then, when the Napoleonic wars and the War of 1812 upset commerce and made English manufactures diffi-

cult to obtain, more American investors began to look to manufacturing instead of shipping, and more factories were built.

New England, with its swift streams for power and its humid climate, which kept cotton and wool fibers in fine condition for spinning and weaving, soon developed an important textile industry. In Pennsylvania, iron for machines and tools and guns was smelted in stone furnaces, with charcoal, which was plentiful in this forested land. Spinning machines driven by steam were operating in New York by 1810, and the first practical power loom was installed at Waltham, Mass., in 1814 by James Lowell. Power machinery was introduced in other industries. But manufacturing, except for textiles, still remained unimportant compared with the production of raw materials.

5. Second Period: The Age of Iron and Steam—1840-1860

DURING THE 20 years after 1840 the effects of the Industrial Revolution were beginning to be felt in most European countries. This period (1840-1860) is sometimes called the Age of Iron and Steam. Coal and iron had become much more plentiful and cheaper. Iron could now be used for parts of machines formerly made of wood, and for rails, farm tools, and many other purposes. Steam power was substituted for water power in factories, and was used to drive locomotives and ships.

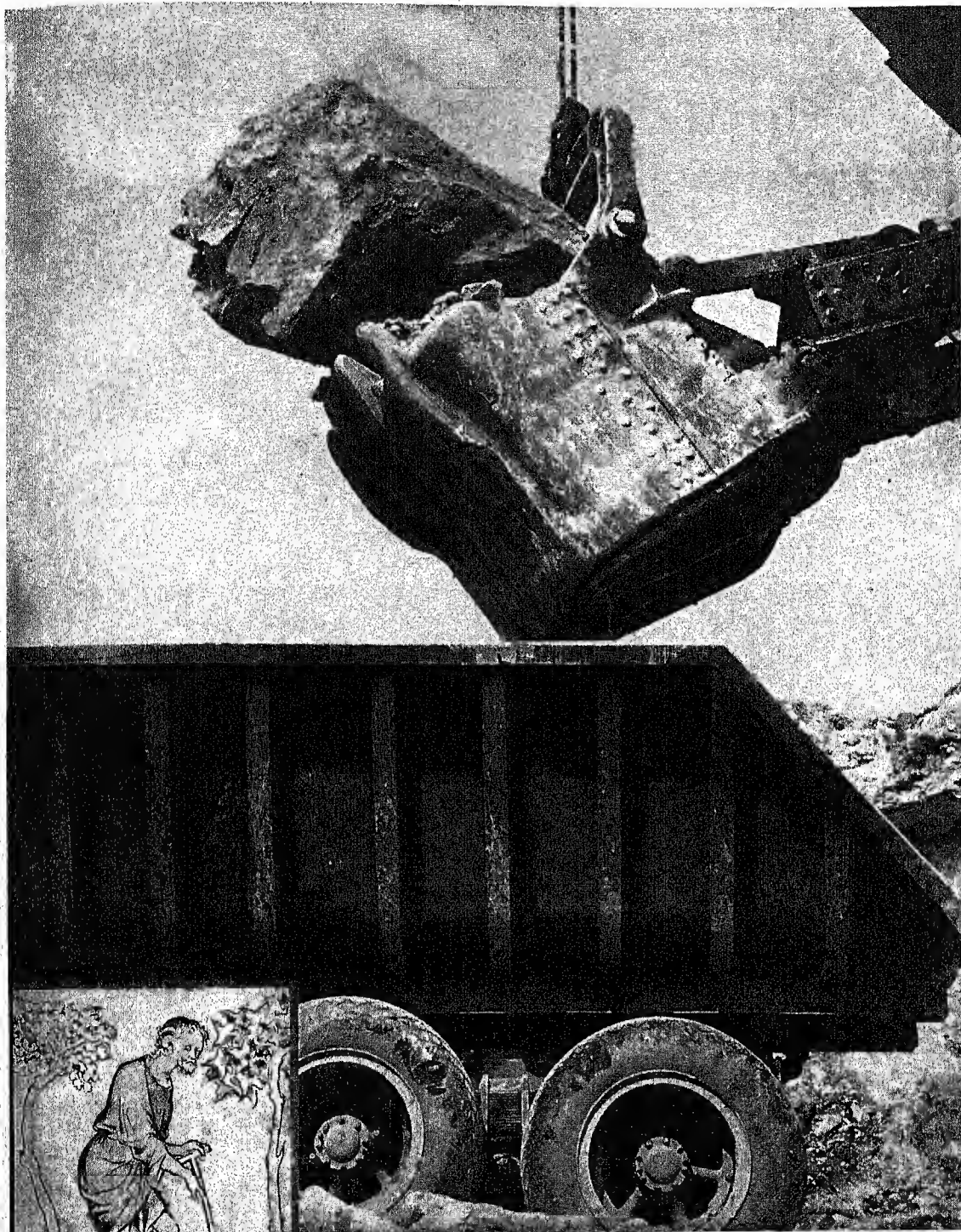
Railroads were spreading rapidly in England and the United States and more slowly in continental Europe. The British were building ocean steamships of iron, which, by the end of this period, were able to beat even the fastest of sailing vessels—the American clippers. (See *Railroads; Ships*.)

Communication was speeded up by the invention of the telegraph, and the first transatlantic cable was laid (see *Telegraph; Cables, Submarine*). The workers who crowded into the industrial cities to get jobs in the factories had to be fed; and so farming for profit was undertaken on a larger scale. The United States soon outdistanced England in large-scale farming, partly because of its extensive areas of fertile lands and partly because new farm machinery was being invented by Americans (see *Agriculture*). Before long, American grain and meat could be sold in England for less than it cost the English farmer to produce them. This enabled the British people to concentrate on manufacturing, and Great Britain became the workshop of the world. British ships carried British goods to all corners of the earth and brought back raw materials and food. The British navy was enlarged to protect the nation's shipping, without which the people would starve and their industries be destroyed. England thus became queen of the seas.

Manufacturing Still Lags in the United States

In the United States, agriculture, fishing, and mining continued to be so profitable that comparatively few people were willing to invest money in industries. But some inventions besides farm machinery were

MAN POWER VERSUS THE MACHINE



The medieval drawing at the left, showing a laborer digging with a spade, is symbolic of human labor with hand tools. How pitifully little work this man could do, even though he used every ounce of strength at his command! The power-driven shovel above, with one or two men to guide it, can do the work of several hundred men with pick and shovel. It can swiftly hollow out the earth for the foundations of great buildings, quarry sand, scoop out iron ore from open-pit mines, and dig cuts for roads or railways. And with a single quick swing of its boom it can dump a huge load into a waiting railway car or truck. In almost every field of work there are today machines to take the place of armies of hand laborers.

made. One of the most important, because it greatly affected the daily life of all the women of the country and revolutionized the clothing industry, was the invention (1846) of Elias Howe's sewing machine (see Howe, Elias; Sewing Machine). During the American Civil War large factories equipped with the new machines were established for the manufacture of soldiers' uniforms. When peace came, these factories turned to making men's suits. For some time these ready-made suits were of poor quality and were bought only by people who could not afford to have their suits made to order by a tailor—a humble beginning for America's great garment industry! (See Clothing Industry.)

During this period the science of making machines was advancing. A new profession arose, that of the mechanical engineer, and problems were approached more scientifically. With better methods of work, more accurate machines were made. Without this development many of the early inventions would never have become of much practical use. (See Machinery; Tools.)

6. Third Period: The Age of Steel— 1860-1914

THE PERIOD FROM 1860 to 1914 may properly be called the Age of Steel. During this period the manufacture of steel became a major industry. Several inventions and discoveries were responsible. The outstanding one was Henry Bessemer's process of steel making (see Iron and Steel). Steel came to be used in a thousand ways undreamed of in past ages. Many of the improvements in industry and transportation which came so rapidly in this period were made possible only by the production of steel in great quantities at low cost.

In producing iron and steel England led the world for many years. It had excellent iron ores with coal mines near by. The United States and Germany also had iron and coal fields near together. By 1914 the United States was leading in the production of iron, and Germany was second, with England third.

New Materials and New Products

The steel age saw new materials come into use. Petroleum, with its many valuable products, reached quantity production in this period (see Petroleum). One of its products, gasoline, became increasingly important as a fuel after the invention of a new means of transportation—the automobile. With the process of vulcanizing rubber already discovered by Goodyear (1839), cultivation of the rubber tree in the Far East got well under way just in time to furnish rubber tires for the new automobiles. Rubber found an untold number of other important uses (see Rubber).

Science made greater progress than ever before. Industrial scientists and inventors solved many vital problems of industry. By analyzing the materials nature gave them, they learned how to create new products as they were needed. Immensely valuable materials were developed from what had formerly been industrial wastes. From the gas that was blown

out of the coke furnaces, chemists produced a long list of products worth many times the value of the coke itself (see Coal; Coal-Tar Products). The great rayon industry of today developed from the discovery that artificial silk could be made from the cellulose in plants, and it uses the cotton linters that used to be thrown away (see Rayon).

Building on the work of such men as Franklin and Faraday, Edison and others gave the world electric lights and countless electrical contrivances to make work easier. Finally the great electric power industry developed, bringing about such fundamental changes in industrial organization that it created a new era.

Consolidation of Small Business Units

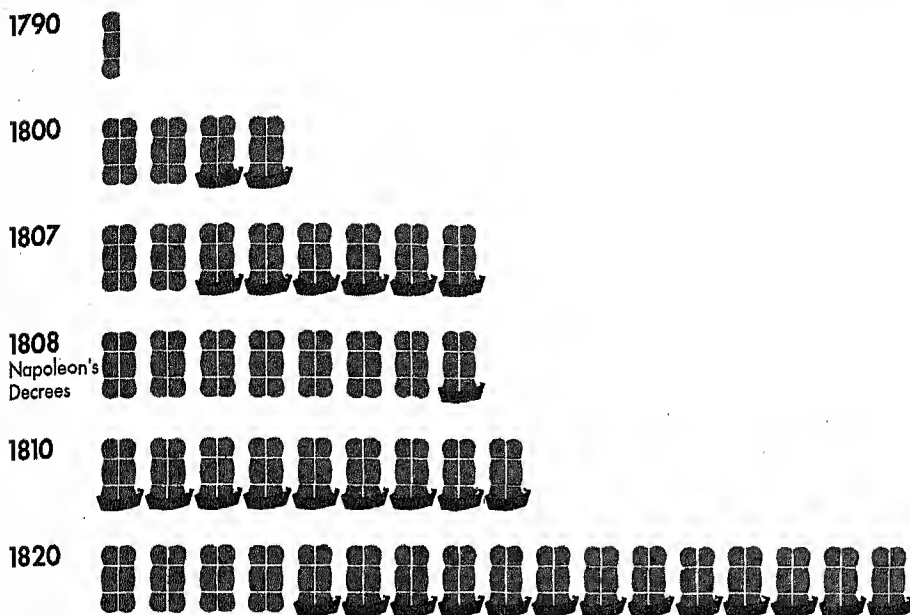
Up to 1860 industry and transportation were organized in small units. Railroads were built chiefly to carry goods between a city and the outlying towns, and the many short lines had tracks of different widths. By 1876 all the railroads began to use the same width of track (standard gauge). About the same time a few of the stronger railroads began to buy up others, consolidating the many small roads into a few large systems.

In manufacturing, too, there was a tendency toward consolidation for greater efficiency. The largest of these consolidations was the formation of the United States Steel Corporation from a number of smaller companies (1901). Many people feared that such combinations, by ending competition, would lead to unnecessarily high prices, and the consumer would suffer. To prevent this, the government enacted anti-trust laws intended to preserve competition. But modern conditions favored the formation of larger business units, and the laws did little to stem the tide. (See Corporations; Trusts; United States History, subheads, Industrial America, 1877-1897, The Control of Industry, 1897-1915.)

Large-Scale Production and the Assembly Line

Giant corporations came into existence partly to obtain the advantages of large-scale production. The United States was a leader in mass production because the country offered a large domestic market. This market came into being with the improvement in transportation and with the rapid increase of population after the Civil War. There were more people in the United States in 1900 than in any of the industrial countries of Europe. Because of the nation's rich natural resources and its efficiently organized industry, people in the United States had more money per capita to spend than the inhabitants of any other country in the world. This enabled a factory making some article of general use to produce thousands or even millions of articles all alike and still dispose of them. With large-scale production it became profitable to carry specialization and division of labor to a high point. When jobs had been subdivided down to very simple operations, new machines were invented to do the work. This again reduced the cost of production and manufacturers were able to reduce prices and still make better profits.

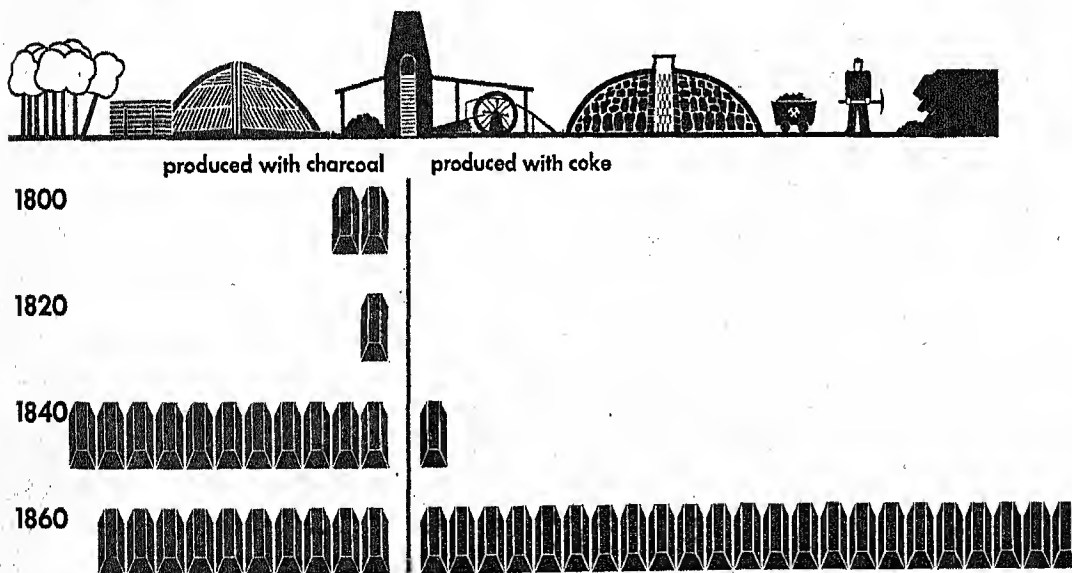
Cotton Production and Exports, United States, 1790 - 1820



Each complete symbol represents 10 million pounds of raw cotton produced on ship: exported

In the early years of the Industrial Revolution cotton growing in the United States increased amazingly. The demands of British cotton manufacturers caused production to double between 1800 and 1807. In the following year, however, Napoleon's decrees forbidding the importation of British goods to the Continent caused a drop in American exports of raw cotton. By 1810 Napoleon's blockade had failed and Great Britain took almost all the American crop. Again in 1820 the crop nearly doubled. English mills took three-fourths of it, for American mills were slow in developing. (Data from Bogart's 'Economic History of the United States'.)

Iron Industry in United States, 1800 - 1860

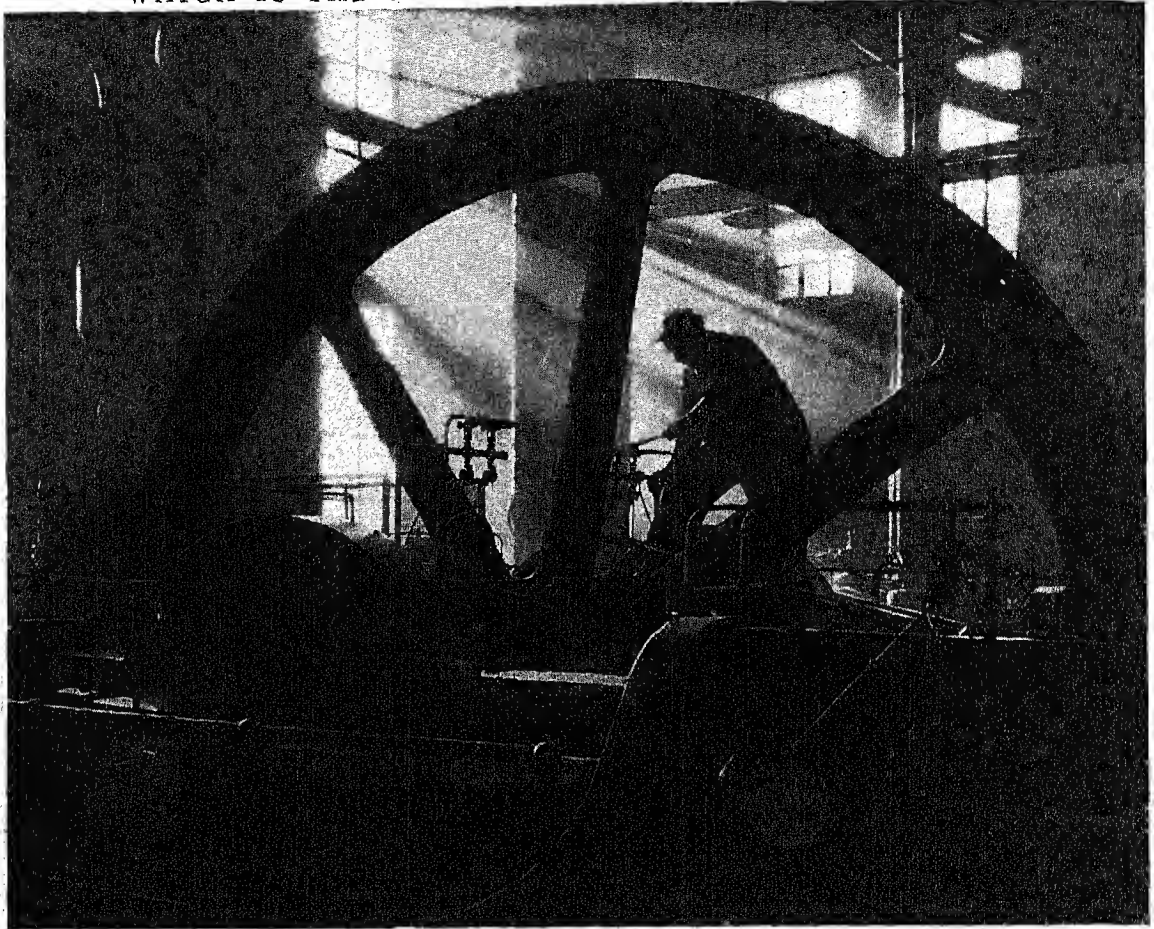


Each symbol represents 25,000 long tons of iron

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The iron industry developed much later in the United States than in England because of the slow growth of American manufactures. The setback between 1800 and 1820 was caused largely by the War of 1812, which paralyzed industry. By 1840, however, with the Industrial Revolution really under way, production of iron had jumped to 12 times the 1820 figure. American furnaces still used chiefly charcoal—already obsolete for half a century in England—because timber was plentiful and it was cheaper to smelt iron where it was mined than to transport it to sites near coal mines. Later, great iron and steel plants sprang up near coal-mining centers. (Data from Bogart's 'Economic History of the United States'; Jennings' 'History of Economic Progress in the United States'.)

WHICH IS THE MASTER—THE MAN OR THE MACHINE?



This picture symbolizes one of the problems that the Machine Age has created. Man masters the world with his machines, but the machines in turn tend to become the masters of men. Thousands of workers can earn their living only with these monsters of steel as their daily partners. The machines speed up, slow down, or stop altogether depending upon the unpredictable demands of trade, and the men who serve the machines must adapt their lives to these blind shifts and uncertainties.

Henry Ford in his automobile factories carried the division of labor to a high point of perfection by means of the assembly line (*see Automobile; Ford, Henry*). His plan has been widely adopted by other industries. Other countries, especially England and Germany, expanded their industries along similar lines.

Struggle for Markets and Raw Materials

Now industry was ahead of commerce, and the great problem that confronted businessmen and nations was how to sell the goods produced. Salesmanship became a leading vocation, backed by nation-wide and often world-wide advertising (*see Advertising*). Another problem was how to provide a constant flow of raw materials to keep the great factories running. Some nations, such as Great Britain, had colonies which took part of their manufactured goods in return for raw materials. Others began seeking new lands to colonize or looked with envy on the colonies of their neighbors (*see Colonies*). Industrial countries exchanged their products with countries which could supply raw materials, or exchanged the manufactures

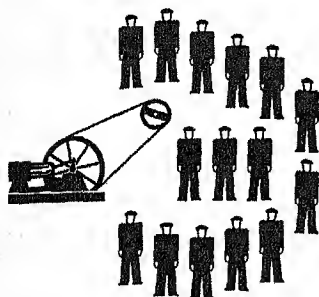
in which they specialized for the special products of other industrial countries. As international trade expanded and the competition for markets grew, nations protected their industries by high tariffs (*see International Trade; Tariff*). The competition for markets played a large part in bringing on the World War.

7. Recent Trends and Some of Our Modern Problems

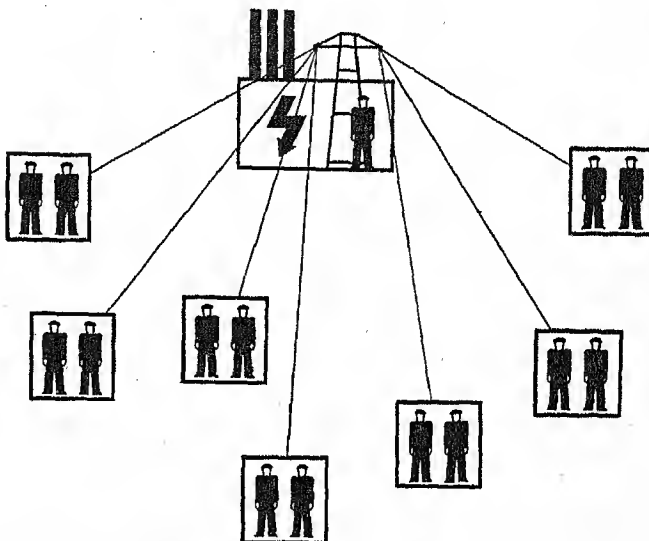
THE 20TH CENTURY, especially in the years since about 1914, has seen a tremendous increase in the use of power and machinery, particularly in the United States, with a correspondingly large increase in the amount of goods produced for every hour of human labor. These changes have been so rapid and their effects have been so momentous that some writers speak of the period since 1900 or 1914 as "The Second Industrial Revolution" or "The Power Age."

Electricity is the chief agent which has brought about this new era in industry. First, it has freed manufacturers from the necessity of locating their

Workers had to work in the neighborhood of the old steam engine



Electricity can be conducted to the worker



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The Industrial Revolution forced the workers to leave the farm or village and lead much less healthy lives crowded together in the industrial districts of large cities. The growing use of electric power may in time overcome this evil, for power to run factories can be carried several hundred miles from the power plant. Decentralization experiments are being made by large industries, such as the Ford Motor Company, which has established small plants near Detroit, where workers can enjoy the benefits of rural life.

plants within reach of abundant supplies of coal. For while steam power and water power had to be used where they were generated, the electric power into which steam power and water power are now converted can be carried many miles away before it is put to work. Electricity has also freed great enterprises from the necessity of concentrating their manufacturing in one vast plant. Thanks to the widespread power stations which will sell them electricity, they can "decentralize" their activities, setting up branch plants wherever they can get the greatest advantages, such as proximity to raw materials or to markets.

Again, electric power has made great changes within factories. It has done away with the wasteful and dangerous maze of belts and shafts which conveyed power from the steam engine to the machines. It has made it possible to place machines in the most convenient spots for continuous, straight-line production. And it has brought into use automatic or semi-automatic machines which turn out automobile parts, bottles, electric-light bulbs, and hundreds of other articles with little help from the human hand. It has given small businesses a chance to survive in competition with the big businesses, for they can buy power at relatively low rates. And it has lifted an enormous burden from the shoulders of the housewife and the farmer, since homes and farms can also be electrified. (See Automatic Devices; Electric Light and Power; Power; Water Power.)

Since 1914 a number of new industries have grown to giant size, such as the automobile industry, the mo-

tion picture business, and radio. Transportation has been transformed by the extensive use of the automobile, the truck, the motor bus, and the airplane. The chemical industry has expanded into fields which were untouched or barely touched in the United States before the war, such as the dye industry and the manufacture of synthetic fibers, plastic materials, and chemical fertilizers. (See Celluloid; Fertilizers; Pyroxylin Products; Soy Bean.)

Management Becomes More Efficient

When factories were small, the owner usually supervised every detail of the business. But as business grew larger, the work of management had to be divided into departments (such as production, sales, purchasing, and accounting), with a manager in charge of each. Personnel departments were built up to hire and train workers, and handle problems arising between the management and its workers. Laboratories employing scientifically trained research men experimented to improve the product and the methods of manufacture. Thus management became subdivided and specialized, just as labor had been in earlier decades.

Another change was *rationalization of industry*, or the study of products and processes to eliminate waste. Slow-selling articles were dropped so that business might concentrate on mass production of more popular ones. Designers of machinery, automobiles, and many other articles standardized them so accurately that their parts became interchangeable and could be made by the thousand or the million, each exactly



like the others. Efficiency experts studied the movements of workers, so that they could be trained to perform their particular tasks without waste effort.

Some Problems of Today

We have only to look about us and we can name a hundred and one effects of the Industrial Revolution—many of them good and some bad. The standard of living has so greatly improved that the masses of the people have comforts and luxuries which even the rich never dreamed of before modern machines were invented. Hours of labor have been so greatly cut down that the workers in many industries make a good living by working eight hours a day and five days a week. Workers thus have leisure for education and recreation such as they never could have had in the days before machines were invented or even in the earlier period of factory production (*see* Leisure; Machinery).

Yet many of our most serious problems today have been created by this speeding up of industry and production. Relations between labor and capital have become increasingly difficult as industry has developed. The tendency of business is to become larger and larger, so that a few giants or even a single enterprise may virtually control an entire industry.

Again, the substitution of the machine for the worker has created what is called "technological unemployment." This means that as machines do more and more of the work in an industry, fewer workers are needed in that industry, just as in the early days of the Industrial Revolution the invention of the power loom threw the weavers out of work. But the weavers who had the intelligence and ability to learn new jobs found a number of other ways of making a living. Some became manufacturers, others mechanics, and still others found work in the factories which made the new machines, or in the iron industry, or on the new railroads.

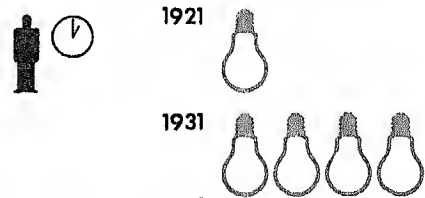
Many economists tell us that in the long run machines create more jobs than they destroy; that workers displaced from one occupation find jobs in new occupations that have come into existence through new inventions. The growing number of electric inventions, for example, while they replaced man power in industry, created a group of new industries—the production of electric power, the automobile, radio, and motion picture industries—which grew to giant proportions and employed vast numbers of people. Today, however, it is questioned whether new machines are not developing at a faster rate than new industries, and the unemployment problem is being given more serious consideration than ever before.

It is certain that the jobs created by new machines and new processes frequently require a higher degree of technical knowledge than was needed in the past. The schools are giving attention to this fact. Students are being trained in vocational classes to become efficient workers in industry and are receiving so broad a training that they can adjust themselves readily to changes. Adult education is also being provided for people who have been thrown out of work, to prepare them to take new jobs as opportunities offer.

Moreover, production has forged ahead of distribution, and better methods of distribution are needed so that more

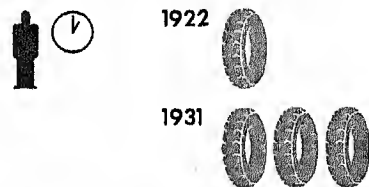
Increase of Productivity in the United States

Electric Lamps Produced per Man-Hour in Electric-Lamp-Assembly Plants



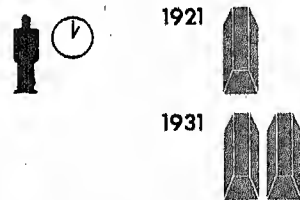
Each symbol represents 10 lamps

Automobile Tires Produced per Man-Hour



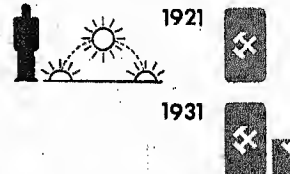
Each symbol represents 10 pounds weight

Pig Iron Produced per Man-Hour



Each symbol represents $\frac{1}{4}$ ton

Bituminous Coal Produced per Man-Day



Each complete symbol represents 4 tons

Displacement of workers by machines is one of industry's most serious problems today. The chart shows how one man's production in an hour or a day in several typical industries has increased as methods of manufacture have become more efficient.

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Work and Leisure per Week in U. S. Manufacturing Industries

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Working hours

1835



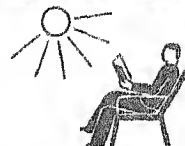
1900



1935



Leisure time



Each clock represents 10 hours weekly

As machines have become more efficient, working hours have been reduced. Whereas the factory worker of a century ago spent 80 of his waking hours at work each week, he now averages only half as many. The Industrial Revolution has brought the worker not only innumerable new things to enjoy, but also an ever-increasing amount of leisure in which to enjoy them.

people may enjoy the goods that are produced. Advertising has become one of the nation's giant businesses. New kinds of stores—department stores, self-service and chain stores, mail-order houses—all try to sell more goods and to cut the costs of distribution so as to put their goods within the reach of more people. Producers have formed cooperative organizations in the effort to increase sales and consumers have formed similar organizations in order to reduce prices. Instalment selling has been introduced

to encourage people to buy. Yet, distribution still lags behind production.

Problems such as these have caused the United States government, like other governments, to step in and make laws regulating industry and business. Industry sometimes complains that regulation causes evils quite as serious as those it has attempted to remedy. One of the great problems today is to determine how far government control of industry should go to serve the best interests of all the people.

—REFERENCE-OUTLINE for Organized Study of the INDUSTRIAL REVOLUTION—

IN the late 18th century a milestone was reached in man's ever-increasing control over nature. In England new machines were invented to replace the old hand tools for spinning and weaving, and steam was harnessed to run the new machines. Thereupon a new era in industry began, first in England, a little later on the continent and in the United States, and still later in Japan, China, and elsewhere. In the century and a half that has since passed, a never-ending succession of new inventions and new ideas has transformed industry—a transformation that has revolutionized men's ways of living. The Industrial Revolution has passed through phase after phase and it still goes on, bringing with it constant changes in the economic, social, and political life of peoples.

This outline, covering the Industrial Revolution from its beginnings in England down to the present time, contains references to the many articles in Compton's which contribute further information to the story told above.

I. CONDITIONS ON THE EVE OF THE INDUSTRIAL REVOLUTION:

A. Commerce:

- a. England's Leadership: E-272.
- b. The Commercial Revolution and Its Effects: C-324, I-74-74a, R-76-7.

B. Industry:

- a. Effect of Immigration from the Continent on English Crafts: E-272, T-68.
- b. Home Industry, the "Putting-out" System, and Infant Factories: I-74a-b.

C. Restrictions on Trade and Industry:

- a. The Mercantile System: C-324-5.
- b. The Guilds: G-87-8.
- c. Growth of Interest in the Doctrine of *Laissez-Faire*: I-74b.

D. Banking: R-76.

E. Agriculture—The Enclosure System Replaces the Medieval Three-Field System: A-59.

F. Transportation: T-122, R-111.

II. BEGINNINGS OF THE INDUSTRIAL REVOLUTION:

A. Inventions in the Textile Industry: I-74c-d, S-258-9. Kay's Flying Shuttle S-259; Hargreaves' Spinning Jenny H-224; Arkwright's Water Frame A-299-300; Crompton's Mule C-399-400; Bell's Cylinder Printing I-74d; Whitney's Cotton Gin W-95-6; the Jacquard Loom S-259, I-74d, S-149 and L-50-1 pictures.

B. Mechanical Power:

a. Use of Water Power: I-74d, W-49, P-339.
b. Invention of the Steam Engine: S-280-1, I-74d. Newcomen's Engine, W-57 picture; James Watt W-56-7.

C. Effect of the New Discoveries on the Coal and Iron Industries: E-272-3, I-74d, I-74e chart.

a. Mining Methods Improved by Steam Power: I-74d.
b. Effect of New Machines on Coal Production: C-283-4.
c. Coke Used in Iron Smelting: I-138, I-142, I-74d.
d. Puddling and Rolling Process Invented by Cort and Onions: I-142, I-74d.

D. Rise of the Factory System: F-2, I-74d.

E. Changes in Agricultural Methods and Their Effect on Industry: A-59-60.

III. CHANGING CONDITIONS IN ENGLAND:

A. Increased Production and Its Effects: E-272-3, I-74g, I-74e chart.

B. Improvements in Transportation: I-74d, I-74g. Canals C-67-8; Roads—Telford and MacAdam R-112; Beginnings of Railroads R-36, L-178; Trevithick I-115; Stephenson S-285; Steamships S-120, S-122; Fulton F-217.

C. Increase in Population and Growth of Cities: P-304, C-240, I-74g, I-74f chart.

D. A New Social and Political Order: E-275.

a. Changing Life of the Working Man: I-74g.
b. Factory Conditions: E-275, C-205, I-74g-h, F-2.
c. Beginnings of Labor Unions: L-44, L-45, I-74h.
d. Early Labor Laws: F-2.
e. Growth of Capital and of a New Class: I-74g, E-275.
f. Political Reforms: The Franchise and Reform Bill of 1832 P-78; Peel and Repeal of Corn Laws P-100.
g. The Utopians and the Beginnings of Socialism: S-180, L-45; Karl Marx M-72.

IV. AMERICA BEFORE THE INDUSTRIAL REVOLUTION:

A. Why the United States Was Slow to Adopt Machine Methods of Manufacture: I-74h, A-158, A-160, F-2.

B. Home Industries of Colonial Times: A-163, A-166.

C. Early Shop Manufactures: U-186, C-335-6. Glass A-173-4; Pewter A-174; Silver A-174-5; Iron and Wool U-234.

D. Transportation: T-122-5.

E. Social Life: U-238-40.

V. BEGINNINGS OF THE MACHINE AGE IN THE UNITED STATES: I-74h.

A. Samuel Slater and the First Cotton Mill: R-95.

B. Effect of Westward Expansion: U-240, U-241.

C. Infant Industries and the Tariff: T-13a, U-244.

D. Growth of Manufacturing Before the Civil War and Its Effects on Conditions in the Country: U-242-3.

a. Industrial North and Agricultural South: U-244.
b. Improvements in Transportation: T-125-6. Canals C-68-9; Steamships S-122; Railroads R-37.
c. Growth of Cities: U-241, C-240, I-74f chart.
d. Social Conditions and Their Problems: U-241, U-242-3. Labor L-43, L-44, L-45.
e. Invention of the Sewing Machine: I-74j. Howe H-346-7.
f. Invention of the Reaper: A-49. McCormick M-3.

VI. SPREAD OF INDUSTRIAL REVOLUTION TO OTHER COUNTRIES: I-74h.

—Japan J-184, J-188-90; China C-221c.

VII. THE INDUSTRIAL AGE UNDER WAY:

A. Advances in Use of Mechanical Power:

a. Electric Power: E-233, E-235, E-214. Men Who Discovered Electricity's Secrets E-231-3.
b. Gas Engine: G-19-20.

B. Speeding Up of Communication, Transportation: U-246.

a. Morse and the Telegraph: T-30-2, M-261-2.

b. The Cable: C-5, C-6-9.

c. Bell and the Telephones: T-34, B-93-4.

d. Radio: R-26-8; Marconi M-61-2.

e. The Great Era of Railroad Building: R-37-8.

f. Influence of Automobile on Modern Life: A-387-93.

g. The Airplane: A-65, A-69-81. The Wrights W-183-4.

C. Iron and Steel a Major Industry: I-74j, I-135.

a. Kelly and Bessemer and Modern Steel Making: I-142-4.

b. The Great Steel-Using Industries: I-146.

c. United States Leads in Industry: I-144.

D. New Machines and Tools: T-108-12, A-391, M-10-11.

E. New Materials and New Products: I-74j. Petroleum P-144-53; Rubber R-163-70; Coal-Tar Products C-288-9; Rayon R-53-5; Alloys A-130-3; Chemical C-177.

F. Organization of Industry:

a. Consolidation of Small Units: I-74j. Corporations C-371-2; Trusts T-145-8, U-246-7.

b. Mass Production with Increasing Specialization—Standardization: I-74j, A-390, E-150-1.

c. Departmental Organization of Factories: I-74j. —Laboratories I-75, C-177.

G. Changes Through Increasing Use of Electric Power: E-237, I-74l-m, I-74m chart.

H. Industrial America, 1877-1915: U-245-8, I-75.

—Immigration I-23.

VIII. FURTHER EFFECTS OF THE INDUSTRIAL REVOLUTION AND SOME OF ITS PROBLEMS:

A. Improved Standard of Living: I-74n, L-93a-b.

B. Effects of Modern Machine on Labor: M-10-11, A-391.

a. "Technological Unemployment": I-74n, E-151.

b. Increased Leisure: L-93a-d, M-10, I-74n chart.

C. Labor Problems and Measures for Their Solution:

a. Labor Organizations: L-44-5.

b. Conflict Between Capital and Labor: I-74n; L-44-5. Industrial Arbitration A-247.

—Effect of the World Depression in the United States R-146f, R-146g.

D. Labor Legislation:

a. Safety: Factory Laws F-2, S-334; Factory Inspection H-256; Employers' Liability E-263.

b. Unemployment Insurance: I-94-5.

E. Effect on Interdependence of Nations: I-74l, I-110a, I-110e.

F. The Problem of Finding Markets for Increased Production: Advertising I-74l, A-23-24a; Effect on Tariffs T-13a; New Merchandising Methods I-74n, C-355-355b.

G. The Problem of Government Control of Industry: I-74o. —United States Depression Experiments R-146f, R-146g.

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How MATERIALS for Man's Needs are OBTAINED and USED

INDUSTRIES AND INDUSTRIAL ARTS. Anatole France wrote a story called 'The Little Leaden Soldier' in which figures of porcelain, terra cotta, ivory, and lead, kept as curios in a cabinet, become alive in the night and tell amazing things to their owner. As interesting as the leaden soldier's exciting history are the stories which vases and carpets, chairs and lamps could tell if they gained the power of speech and told us how they were made.

In a single day we see hundreds of commonplace objects, each with its separate story of human inventiveness, of the work of minds, hands, and machines. We cross a bridge on the way to school. What principles of construction make it strong enough to support the heaviest traffic? What processes fashioned the steel of its girders, enabling them to withstand wind and storm, heat and cold? We read a book. True, the mind of the writer conceived the words on the printed page; but between his creative thought and the book in our hands is a long story of trees felled to make paper; of metal flowing into intricate machines to make type; of pictures brought to us by skill of photographer, engraver, and electrotypist; of presses, folders, and binding machines.

Bridges and books, dresses and shoes, pencils and plates—almost everything which makes for comfort and pleasure in our daily lives causes us to ask these questions, "Why? What? How?" The answer is the story of industry.

We are apt to think of industry as a new picture, a creation of today with whirring machines in huge factories turning out motor cars, electric ice boxes, patented can openers, and a million other things. The motor car, the airplane, the rayon plant, and other important industries are so new that many of us can remember their beginnings. But, viewed in a larger perspective, the story of industry goes back to the beginning of human history. At its center is the basic fact that men have always managed to make what they needed in their scheme of life. Thus, since fundamental human needs remain the same in all ages, certain industries—and many manufacturing methods—have survived for thousands of years.

The textile industry, for example, since its remote beginning has used wool, flax, cotton, and silk; and it still does, though various synthetic fibers such as rayon, lastex, and lanital are also used today. The processes of spinning and weaving, too, remain essentially the same, even though the old hand method has been replaced by machines. The dyer has a heritage as colorful as his materials (*see Dyes; Fibers*).

Back to one of the commonest of substances—clay—goes the origin of pottery, one of the most fundamental of industries, necessary to even a primitive way of life. How many centuries ago men learned to shape a sail, to catch the wind, to fashion a sword or an arrow, to grind grain for bread, no one can even guess. If we could master the history of industry in

its entirety we should learn, in the course of our study, the whole history of civilization.

A hundred years ago, four-fifths of the population of the United States were engaged in agricultural pursuits. A country which is predominantly agricultural is always one in which life is simple and luxuries are few. But during the past century there has been a steady decrease in the number engaged in farming, and an increase in industrial and professional workers. Even as late as 1880 almost half of America's workers were engaged in agriculture, forestry, and fisheries. It is estimated that less than one-fourth of the workers are engaged in these occupations today.

Factories in America, exclusive of small shops and those engaged in repair work, add more than 30 billion dollars in an average year to the value of the raw materials with which they work. Statistics for 1869, including even the smallest shops, show only \$1,395,000,000 added to the value of materials by manufacturing processes. Wages are higher and the industrial output per capita is greater in the United States than in any other country. In short, the American industrial system, for efficiency and successful operation, is a marvel of the entire world.

What has contributed to the development of this gigantic system? Though the United States is very rich in natural resources, the discovery of new raw materials has been a small factor in the rapid increase of output. Rather, according to the United States Department of Commerce, "the principal factors in the recent increase in productivity are human as distinguished from natural factors." Thus we see that even in a machine age we progress largely because of the vision and skill of men.

Back of all this progress is the vast amount of research which has taken place in America within the past few decades. In the laboratory, where scientists labor patiently for years to improve one small manufacturing process or to evolve one new formula, originate the most important steps in our march to industrial supremacy. Out of the laboratory came the incandescent bulb, the radio, the X-ray, the automobile, the airplane, to take their important places in modern industry and modern life. The United States government is engaged in research in a wide variety of fields and on an enormous scale. Universities and foundations make important contributions from their own laboratories to industry as well as to abstract knowledge. In the canning industry, the leather industry, the sugar industry, and many others, the spirit of research has been applied by men of science in order that American products might be brought nearer to perfection and their manufacture brought nearer to maximum efficiency.

Labor-saving machinery and mass production have added greatly to industrial efficiency. The constant study by executives of manufacturing and marketing methods, as thorough in its way as the work of the

inventor, is another contributing cause. Modern industry has traveled a long way from the days when each laborer worked alone, creating with his hands an article conforming to his own original ideas.

The danger is that we may lose sight of the element of beauty in the things we produce in huge quantities. It is certain that factory-made furniture, pottery, clothing, and metal objects lack much of the individual charm which the craftsman put into these things before the machine usurped his place in the industrial scheme. It is to avert this danger that design is taught in the schools and a knowledge of the industrial arts given through manual training. Good design in the useful arts is closely linked up with the idea of utility. If a household article or a tool serves its purpose well, and, without meaningless ornament, follows the lines dictated by a practical standard, it may well be said to be beautiful. There is no fundamental reason why industry should not produce things esthetically as well as economically good.

Since we must supply all our own needs today, not by making the articles we require, but by buying them, it is of real monetary value to be able to judge

quality. Only by understanding something of their manufacture and something of the raw materials used in them can we gain a grasp of value, and only by an understanding of the principles of good design can we hope to gratify our desire for beauty satisfactorily.

The study of industrial arts in the schools has other objectives. Activities involving the use of tools and materials develop manual skill, initiative, and creative thinking. When the pupil carries through a project in wood working, electricity, or metal working he comes in contact with the practical applications of mathematics and science. Often he acquires interests and discovers aptitudes which lead to the choice of a definite vocation.

Equally important is the intelligent appreciation, fostered by school training in industrial arts, of the value of industrial work and its place in society. Pupils are taught to cultivate an inquiring mind regarding the various industrial processes, the people concerned in them, and the conditions under which they work. This leads to a conception of the dependence of one group on another, which is educational and essential to sound economics and social life.

—REFERENCE-OUTLINE for Organized Study of INDUSTRIES and INDUSTRIAL ARTS—

THE very backbone of modern civilization is the great number of industries that have been built up since the Industrial Revolution. To study them all in detail would be to branch into botany, zoölogy, geology, chemistry, physics, economics, geography, and the arts. This outline is intended merely as a general survey of the chief materials of industry and of the principal ways in which they are obtained and used, together with a brief summary of the important sources of power and methods of transportation and communication.

I. HUNTING, TRAPPING, AND FISHING:

A. Hunting and Trapping: T-127.

- a. Furs and Fur Trade: F-223. Hudson's Bay Company H-350. (For individual fur-bearing animals see the Reference-Outline for Zoölogy.)
- b. Other Products: Bone B-172; Feathers F-20; Ivory I-175; Perfumes P-122.

B. Fisheries: F-78.

- a. Fish: F-67. (See also individual names of fishes listed in Reference-Outline for Zoölogy.)
- b. Water Mammals and Reptiles: Porpoise P-306; Seal S-68; Turtle T-166; Walrus W-6; Whale W-77.
- c. Mollusks and Crustaceans: M-218. (See also list of shellfish and related foods in Reference-Outline for Home Economics.)
- d. Other Sea Products: Coral C-362; Pearls P-97; Sponges S-260.

II. FOOD AND ALLIED INDUSTRIES:

A. Production of Foods: Agriculture A-47 and Reference-Outline A-60; Fish Culture F-76.

B. Manufacture of Foods:

- a. Beverages: Cocoa C-292; Coffee C-294; Malt M-43; Tea T-21; Wine G-136.
- b. Flour Industries: F-117. Bread and Baking B-228; Breakfast Cereals B-233; Macaroni M-1.
- c. Sugar Industries: S-319. Candy C-70; Chocolate C-223; Maple Sugar M-54.
- d. Flavorings: Pepper P-119; Salt S-15; Spices and Condiments S-249; Vinegar V-300.

e. Dairying: D-1. Butter B-281; Cheese C-164; Milk M-172.

f. Slaughtering and Meat Packing: M-96.

g. Other Food Manufactures: Fats and Oils F-17; Gelatin G-25; Oleomargarine O-221; Yeast Y-204.

C. Allied Industries: Baking Powder B-15; Chewing Gum C-185; Tobacco T-102.

D. Preservation of Foods: Canning C-73; Drying and Dehydration D-38, P-358; Refrigeration R-67, C-299.

III. TEXTILE AND CLOTHING INDUSTRIES: T-61, C-277.

A. Kinds of Fibers: F-30. Asbestos A-323; Cotton C-375; Flax F-105; Hemp H-272; Jute J-232; Sisal S-154.

B. Processes in Cloth Making: Spinning and Weaving S-258; Bleaching B-155; Dyeing D-121; Mercerizing M-118.

C. Kinds of Cloth: C-273, T-69. Cotton C-375; Felt F-23; Linen L-148; Rayon R-53; Silk S-144; Wool W-140.

D. Clothing: C-277. Buttons B-286; Gloves G-106; Hats and Caps H-235; Knitted Wear K-31; Lace L-47. (See also Reference-Outline for Home Economics.)

E. Other Fiber and Textile Products: Brooms B-250; Linoleum and Oilcloth L-148; Rope and Twine R-153; Rugs and Carpets R-171; Tapestry T-9; Thread T-85.

IV. MINING AND MINERAL INDUSTRIES:

A. Minerals and Their Uses:

- a. Metallic: M-122. Aluminum A-138; Antimony A-222; Bismuth B-148; Cobalt C-290; Copper C-357; Gold G-111; Iron I-133; Lead L-76; Manganese M-51; Mercury M-119; Nickel N-142; Platinum P-246; Radium R-33; Silver S-150; Tin T-98; Tungsten T-150; Zinc Z-217.

- b. Non-Metallic: M-181. Asbestos A-323; Asphalt A-336; Borax B-192; Chalk C-137; Clay C-259; Coal C-283; Diamond D-59; Emery E-260; Fuller's Earth F-217; Gems G-25; Granite G-131; Graphite G-136; Gypsum G-190; Limestone L-138; Marble M-60; Mica M-145; Natural Gas G-23; Petroleum P-144; Potash P-323; Salt S-15; Sand S-21; Sandstone S-23; Slate S-158; Sulphur S-323; Talc T-6.

- B. Industries:** Alloys A-130, B-249; Assaying A-338; Electroplating E-243; Iron and Steel I-133; Metallurgy M-122; Metal Working M-123; Mining M-185; Quarrying Q-1; Welding W-70.
- V. METAL MANUFACTURES:**
- A. Machinery:** M-10. (*See also* list of machines under entry Machinery in Fact-Index.)
- B. Metal Devices:** Armor-Plate A-306; Artillery A-319; Automatic Devices A-384; Bells B-91; Cables C-4; Firearms F-48, M-5; Jewelry G-25; Knives and Forks K-33; Lamps L-56; Locks and Keys L-176; Nails N-1; Pens P-103; Rails R-38; Steamships S-120; Stoves S-304; Tools T-108; Torpedoes and Mines T-113; Traps T-127; Watches and Clocks W-35; Wire W-119.
- VI. CLAY AND GLASS PRODUCTS:**
- A. Clay:** C-259. Brick and Tile B-236; Enameled Ware E-263; Pottery and Porcelain P-327.
- B. Glass:** G-101. Lens L-96; Mirrors M-199; Optical Goods M-156, T-40.
- VII. WOOD PRODUCTS INDUSTRIES:**
- A. Woods:** Ebony E-143; Eucalyptus E-314; Mahogany M-36; Sandalwood S-23; Tamarind T-7; Teak T-27. (*For a list of native American trees see Reference-Outline for Nature Study.*)
- B. Forests and Forest Protection:** F-154. Lumber L-212.
- C. Manufacturing Industries:** Furniture Making F-219. Wood-Working W-138; Veneer V-274.
- a. Products Derived from Wood:** Camphor C-42; Cellulose C-123 and picture; Charcoal C-144; Cork C-365 and pictures; Creosote C-394; Glue G-107; Gums G-188; Gutta-Percha G-190; Lacquer L-52; Paper Pulp P-56; Resins R-78; Rubber R-163; Turpentine T-165.
- b. Products Made of Wood:** Baskets and Boxes B-119; Furniture F-219; Pencils P-106. (*See also* list under entry Wood in Fact-Index.)
- VIII. PAPER, PRINTING, AND PUBLISHING INDUSTRIES:**
- A. Paper Making:** P-56. Papier-Mâché P-63; Wall Paper W-3.
- B. Printing:** P-346.
- a. Processes and Machinery:** Electrotyping E-243; Embossing E-258; Engraving E-293; Linotype L-149; Lithography L-164; Monotype M-237; Stereotyping S-287; Type and Typography T-172.
- b. Books and Bookmaking:** B-175, B-184. Binding B-182.
- c. Newspapers, Magazines, and Periodicals:** N-104.
- C. Bookselling and Publishing:** B-189.
- IX. LEATHER AND ITS MANUFACTURES:** L-33.
- A. Kinds of Leather:** (*See* Leather in Fact-Index.)
- B. Leather Goods:** Gloves G-106; Shoes S-130; Book Bindings B-182; Parchment and Vellum P-57.
- X. CHEMICAL AND ALLIED INDUSTRIES:**
- A. Chemical Manufactures:** Alcohol A-112; Ammonia A-188; Arsenic A-310; Borax B-192; Camphor C-42; Carbon C-82; Carborundum S-144; Celluloid C-122; Cellulose C-123; Chlorine C-223; Coal-Tar Products C-288; Creosote C-394; Drugs D-114, N-12; Dyes D-121; Explosives E-347, D-122; Fertilizers F-27, P-323; Fire-Extinguishers F-58; Fireworks F-60; Glue G-107; Glycerin G-108; Graphite G-136; Hydrogen H-368; Ink I-79; Matches M-86; Nitrogen N-147; Oils F-17; Paints and Varnishes P-32, V-273; Perfumes P-122; Pyroxylin Products P-373; Rayon R-53; Soap S-175; Sulphur S-323; Sulphuric Acid S-324; Tar T-12; Turpentine T-165; Wax W-58.
- B. Photographic Industry:** P-179, M-280.
- C. Rubber Industry:** R-163.
- XI. POWER AND ITS APPLICATION:** P-339.
- A. Animals:** Ass A-337; Buffalo B-261; Camel C-36; Cattle (Oxen) C-101; Dog D-76; Elephant E-244; Horses and Mules H-341; Yak Y-203 and picture.
- B. Air and Wind:** A-62 picture, W-112.
- C. Water:** W-49. Tide T-90.
- D. Fuels:** F-215. Alcohol A-112; Charcoal C-144; Coal C-283; Coke C-298; Gas, Manufactured G-22; Gas, Natural G-23; Gasoline G-24; Kerosene P-145; Peat P-98; Petroleum P-144; Wood F-45, F-215.
- E. Electricity (Usually a Form of Converted Power):** E-219. Primary Batteries Converting Chemical into Electrical Energy E-214; Generators Converting Mechanical into Electrical Energy E-215.
- F. Devices for Utilizing Power:**
- a. From Animals:** Agricultural Machinery A-60, P-259; Vehicles of Transportation T-121.
- b. From Air and Wind:** Brakes B-224; Pneumatic Appliances P-286; Sailing Ships S-117; Windmills W-111.
- c. From Water:** Hydraulic Machinery H-366; Water Turbine T-155; Water Wheel W-43 picture, W-49.
- d. From Fuels:** Gas Engine G-19; Lamp L-56; Steam Engine S-280; Steam Turbine T-155.
- e. From Electricity:** Electric Motor E-215; Electric Light E-233.
- f. Transmission of Power by Machinery:** M-10.
- G. Devices for Storing Power:** Dam D-6; Compressed Air and Gases P-266, G-19, R-68; Storage Battery E-214.
- XII. ENGINEERING AND CONSTRUCTION:** E-267.
- A. Building Construction:** B-263.
- a. Architecture:** A-257; Surveying: S-331.
- b. Fireproofing:** F-59; Elevator: E-250.
- B. Heating and Ventilation:** H-263; Lighting: L-56, E-233, G-22.
- C. Sanitation:** Aqueducts A-235; Plumbing P-260; Sewerage S-87; Waterworks W-53.
- D. Electrical Equipment:** E-233. Electric Battery E-214; Electric Generator and Motor E-215; Photoelectric Devices P-177; Radio R-17; Television and Telephotography T-41; Transformer T-119.
- E. Highway and Waterway Construction:** Bridges B-239; Canals C-67; Harbors and Ports H-214; Jetties J-214; Lighthouses L-131; Railroads R-36; Roads and Streets R-111.
- F. Ships, Vehicles, and Aircraft:** Shipbuilding S-124; Automobiles A-387; Airplanes A-65; Balloon B-21.
- G. Irrigation and Reclamation:** I-147. Dam D-6.
- H. Mine Construction:** M-187 picture.
- XIII. TRANSPORTATION AND COMMUNICATION:** T-120 picture, T-121.
- A. Land Transportation:**
- a. Highways:** Roads and Streets R-111; Bridges B-239; Tunnels and Subways T-152; Railroads R-36.
- b. Vehicles:** Automobiles and Busses A-387; Bicycles and Motorcycles B-107; Locomotives L-177; Street-Cars, Elevated Trains, Subway Trains S-306.
- B. Water Transportation:** N-46.
- a. Waterways:** Lakes L-55; Rivers and Inland Waterways R-109; Canals C-67; Ocean Routes A-359 map, C-323 map, P-8-9 map; Harbors and Ports H-214.
- b. Craft:** B-161. Canoes C-75; Motor Boats M-291; Ships S-117; Submarines S-311.
- C. Air Transportation:** Airplane A-65; Balloon B-21.
- D. Communications:** Cables C-4; Postoffice P-317; Radio R-17; Signaling S-141; Telegraph T-30; Telephone T-34; Television and Telephotography T-41.
- E. Public Utilities:** P-364.
- XIV. AMUSEMENT INDUSTRIES:**
- A. Motion Pictures:** M-273. Theater T-74.
- B. Musical Instruments:** M-321.
- C. Toys:** T-117. Dolls D-85.
- XV. ADVERTISING:** A-23. Electric Signs E-238.
- XVI. INDUSTRIAL TRAINING AND MANAGEMENT:**
- A. Training:** Schools S-40; Universities and Colleges U-257, C-301; Vocational Education V-313.
- B. Management:** (*See* Reference-Outline for Economics.)
- C. Industrial Leaders and Inventors:** I-111. Sir Humphry Davy D-20; Thomas Edison E-159; Henry Ford F-152;

Robert Fulton F-217; G. W. Goethals G-109; James Har-
groaves H-224; Elias Howe H-346; Cyrus McCormick
M-3; Guglielmo Marconi M-61; S. F. B. Morse M-261;
George Stephenson S-285; James Watt W-56; Eli Whit-
ney W-95; Orville and Wilbur Wright W-183.

XVII. INDUSTRIAL ARTS IN THE SCHOOLS: I-76.

- A. Graphic Arts: Drawing D-99 (Mechanical D-101, Map
Making M-58 pictures); Painting P-13; Sculpture S-52,
Photography P-179; Engraving and Etching E-293.
- B. Basketry and Related Work:
 - a. How to Make a Simple Basket: B-59 and picture.
 - b. Knots, Hitches, and Splices: K-33.
- C. Wood-Working and Wood-Carving: W-136.
 - a. How to Make Kites: K-26, K-28 and pictures.
 - b. How to Make a Bow and Arrow: A-254 picture.
 - c. How to Build Birdhouses: B-141-2, B-143 pictures.
 - d. How to Build a Model Airplane: A-92-4 pictures.
- D. Pottery and Cement: Pottery P-327; Making Concrete
C-126; Brick Laying B-238.
- E. Metal Working: M-123.
- F. Mechanics: M-103.

—How Things Work: Air-Brake B-224 picture; Airplane
A-75; Automobile A-393; Army Rifle F-51 picture;
Clock W-36 picture; Cylinder Lock L-177 picture;
Diesel Engine G-20 picture; Gas Meter M-129 picture;
Gyroscope Compass G-192 picture; Linotype L-149;
Machine Gun M-6; Monotype M-237; Motion Picture
Camera M-278 picture; Phonograph P-175 picture;
Pump P-367 picture; Steam Engine S-281-4 and pictures.
- G. Electrical Work:
 - a. Principles: Dry Cell E-214 picture; Galvanometer
G-2; Electric Clock W-41 picture; Electric Meter
M-129 picture; Radio R-17; Telegraph T-33 pic-
tures; Telephone T-35 picture; Transformer T-119
picture.
 - b. Projects: Methods of Wiring Batteries E-215 pic-
ture; Methods of Wiring Lamps E-223 picture;
Making a Wet Battery E-214; Making an Elec-
tromagnet M-35; Three Ways of Generating Elec-
tricity E-220; A Simple Method of Silver Plating
E-226 picture; How to Measure Electrical Resistance
E-224 picture.
- H. Domestic Arts and Crafts: H-325. (See also Reference-
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INITIATIVE, REFERENDUM, AND RECALL. The con-
stitution makers of the early United States distrusted
the ability of the people to govern themselves directly,
and so introduced a system of checks and balances,
and indirect government through elected representa-
tive assemblies holding office for a definite period.
The acts of Congress and legislatures were subject
not only to the veto of the president or governor, but
to review by courts appointed generally for life.
Times have changed since then, and today the people
seek to curb somewhat the authority of their repre-
sentatives. Three of the modern weapons in the fight
to place more direct power in the hands of the people
are the initiative, referendum, and recall.

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The first two are methods of controlling the law-
making body. Your Latin will tell you the meaning
of the terms: initiative from *initio*, meaning "begin,"
and referendum from *refero*, "carry back." The
initiative then is the means by which the people may
begin making a law, and the referendum the means
by which they may act upon a law already passed.

Of these two the referendum is the older. It was
in use in some of the Swiss cantons as early as the 16th
century. When the United States was formed three
of the new state constitutions were referred to the
people for their approval; and by 1820 the referendum
on constitutional questions was generally in use in
this country. Local matters, such as locating county

seats, borrowing money, etc., were also submitted to localities affected, even in colonial times. But not until 1898 did a state confer upon its citizens the right to vote upon legislation already enacted. In that year South Dakota passed a law to that effect; many states followed its example. Under the referendum, any citizen believing a law to be bad can circulate a petition asking that it be submitted to a popular vote. To succeed, the petition must be signed by from 5 to 10 per cent of the registered voters (the proportion varies in different states).

The next step was logical. If citizens could reject laws passed by representatives, why were they not capable of originating laws neglected by the legislators? Oregon, under the leadership of lawyer-reformer William U'Ren, began the movement in 1902 and the "Oregon Plan" has been followed by other states. The details of the initiative laws, like those for the referendum, differ in different states. In some the bill is placed on the ballot as soon as the petition is filed. In others it must be submitted to the legislature and then, if that body refuses to act, it goes to the people.

The recall controls officials rather than legislation. It is a method for removing unsatisfactory men from office before the end of their terms. This is usually accomplished by holding a new election whenever a certain proportion of the voters demand it. To keep his place, the official in question must defeat the candidate of the opposition.

INK. Ever since writing was invented men have wanted ink that would make a permanent mark and be convenient to use. What was probably the very earliest ink remains today the most nearly permanent. This is the so-called carbon ink made of soot mixed with glue and water. Egyptian documents written with this ink more than 4,000 years ago are still black and clear. But carbon ink tends to cake in the bottle and on pen points, and it clogs a fountain pen immediately.

A good modern writing ink combines permanence with convenience by including in its make-up two kinds of substances—an organic dye and an inorganic metallic salt. With reasonable protection from exposure the dye keeps its color indefinitely. But if air and sunlight do oxidize and *fade* the organic dye, the same chemical reaction will oxidize and *darken* the inorganic salt. Thus the writing remains visible.

Synthetic dyes made from coal tar are commonly used to produce the characteristic colors—black, blue, red, green, etc. A standard formula for blue-black writing ink, published by the United States Bureau of Standards, calls for a blue dye, gallic acid, ferrous sulphate, and tartaric acid. In the presence of the tartaric acid, the gallic acid forms a relatively colorless compound with the iron salt, but as this compound slowly oxidizes it turns black.

For centuries some of the best writing inks were made without dyes, simply by mixing ferrous sulphate (the "green vitriol" of the alchemists) with gallic acid and water, and allowing it partially to darken

before use. The dark insoluble pigment formed by oxidation was prevented from settling by the addition of gum arabic or some other water-soluble gum.

The gallic acid used in making these inks was produced by the fermentation of tannic acid, extracted from nutgalls imported from China and Turkey. Nutgalls are growths that form on oak trees when gallflies lay their eggs in the bark (*see Oak*).

The color of these pre-oxidized inks was sometimes modified by the addition of indigo or logwood extract, and later of coal-tar dyes. In permanence these inks equaled the more modern writing fluids, but they tended to thicken and to deposit sediment. They were not satisfactory for fountain pens.

Fountain-Pen Inks

Ink for fountain pens must be exceptionally free-flowing and must contain nothing that will attack the rubber sac of a self-filling pen. Some fountain-pen manufacturers prepare special inks for their own pens.

Ingredients that may be added include substances like glycerin to prevent evaporation, chemicals to prevent mold, solvents to hold the dyes in solution, and wetting agents to help the flow and let the ink penetrate rapidly into the paper. One type of ink, made with an alkali, sinks into the paper and dries instantly. Since the iron salts used in ordinary ink-making are not soluble in an alkali, vanadium and molybdenum salts are used. This ink is so free-flowing that it requires a specially designed fountain pen.

Drawing Inks and Some Others

The black drawing ink (India ink) used by artists and draftsmen today closely resembles the ancient carbon ink of the Egyptians. It is made from "gas black" or "carbon black." This is the soot or carbon dust that forms on a cold porcelain plate if you lower it into a yellowish, smoky gas flame. The carbon dust is suspended in water containing small amounts of glue and soap. The ink can be made waterproof by adding a solution of shellac containing borax and ammonia. To make colored drawing inks, suitable dyes are substituted for the carbon black.

Prussian blue, a compound of iron and cyanide, is mixed with water and oxalic acid to form a permanent waterproof ink suitable for use with dip pens. It resists ink eradicators, but can be washed off with soap. Other washable inks are made with water-soluble dyes. They can usually be removed from cotton, linen, and rayon more easily than from silk and wool.

The marking ink used by laundries to identify garments usually is made of silver nitrate dissolved in water and ammonia. Sepia ink, one of the most lasting of the natural inks, is made from a fluid produced by the "ink gland" of the cuttlefish or squid (*see Cuttlefish*). Before the discovery of coal-tar dyes, a brilliant red ink used to be made of the dried bodies of the tiny cochineal insects (*see Cochineal*).

Inks for Secret Writing

The so-called invisible or sympathetic inks are those that do not show on the paper when they are used.

Some of the favorite secret inks are lead acetate solution, whose invisible marks turn black upon exposure to sulphureted hydrogen; cobalt nitrate solution, which turns blue when it is treated with oxalic acid; cobalt chloride or nitrochloride, which becomes green when heated; and starch water, which turns blue in iodine fumes. A clean pen dipped in lemon juice will produce writing which will not be noticed when dry, but which stands out sharply in brown when the paper is warmed.

Duplicating and Typewriter Inks

Duplicating or copying inks can be designed to produce 200 to 300 copies from the original writing. Their remarkable copying power depends upon the intense color strength of a few violet and blue dyes. A fewer number of copies are obtained with other colors. Glycerin, alcohol, and other solvents in addition to water are used to keep the ink moist and to build up a high concentration of the special dyes required. Stamp-pad inks and those used on typewriter ribbons are closely related to duplicating inks.

The development of carbon paper has decreased the use of copying inks. This paper is coated with a mixture of waxes and oils containing carbon black or colored dyes.

Printing Inks

Printing inks are made in the form of a paste, which is applied to the printing surface by rubbery rollers molded of glue and glycerin. These inks differ greatly in composition and consistency, according to the purpose for which they are used. The chief ingredients are black or colored pigments mixed with linseed oil, or with mineral oils and rosin for the cheaper grades. Chemical driers, such as salts of lead or cobalt, are usually added to hasten oxidation. The oil is first converted into a varnish by boiling it until it reaches the desired thickness, then mixed into a thick paste with the pigments and other substances. Then this paste is ground in mills until every trace of grit has disappeared.

The introduction of high-speed color presses for magazine printing has brought many new types of ink into existence. They are fast drying and contain dissolved synthetic resins that act as binders for colored pigments, and take the place of the slower drying linseed oil varnish. Dyes dissolved in alcohol are also used to make cheap, quick-drying printing inks.

INNOCENT, POPES. Thirteen popes have borne this name, beginning with INNOCENT I, who was in office from 402 to 417. He was an able and energetic man, who lost no opportunity to assert the papal power, but his reign was disturbed by Alaric's sack of Rome in 410. INNOCENT II (Pope, 1130-1143) condemned the scholar Abelard for heresy.

INNOCENT III (Pope, 1198-1216) was in many respects the ablest and most powerful pope of the Middle Ages. His lofty and severe character inspired universal respect. He greatly strengthened the temporal power of the papacy, for in addition to the Papal States, which he ruled in Italy, he had as vassal states under him Sicily and Naples, Sweden, Denmark, Portugal, Aragon, and Poland. It was to him that King John surrendered England, receiving it back from the pope's legate as a fief. He also put in practice the papal claim to set up and pull down emperors of the Holy Roman Empire, in the case of Philip of Swabia and Otto IV. While he was pope occurred the Fourth Crusade and the Latin conquest of Constantinople.

INNOCENT VII (1404-1406) was one of the popes during the Great Schism of the Church. Under INNOCENT VIII (1484-1492) corruption reigned at Rome. INNOCENT X (1644-1655), INNOCENT XI (1676-1689), and INNOCENT XII (1691-1700) were all reforming popes, who combated heresy and sought to improve the Roman administration. The others require no separate mention.

INQUISITION. To check the waves of heresy that swept over Europe in the 13th century, the Church of Rome established a special tribunal called the Inquisition to try persons accused of revolting against religious authority. Up to that time heresy trials had been conducted by the local bishops. The new Inquisition courts, which soon were put in the hands of the Dominican friars, were able to carry forward the work on a broader scale.

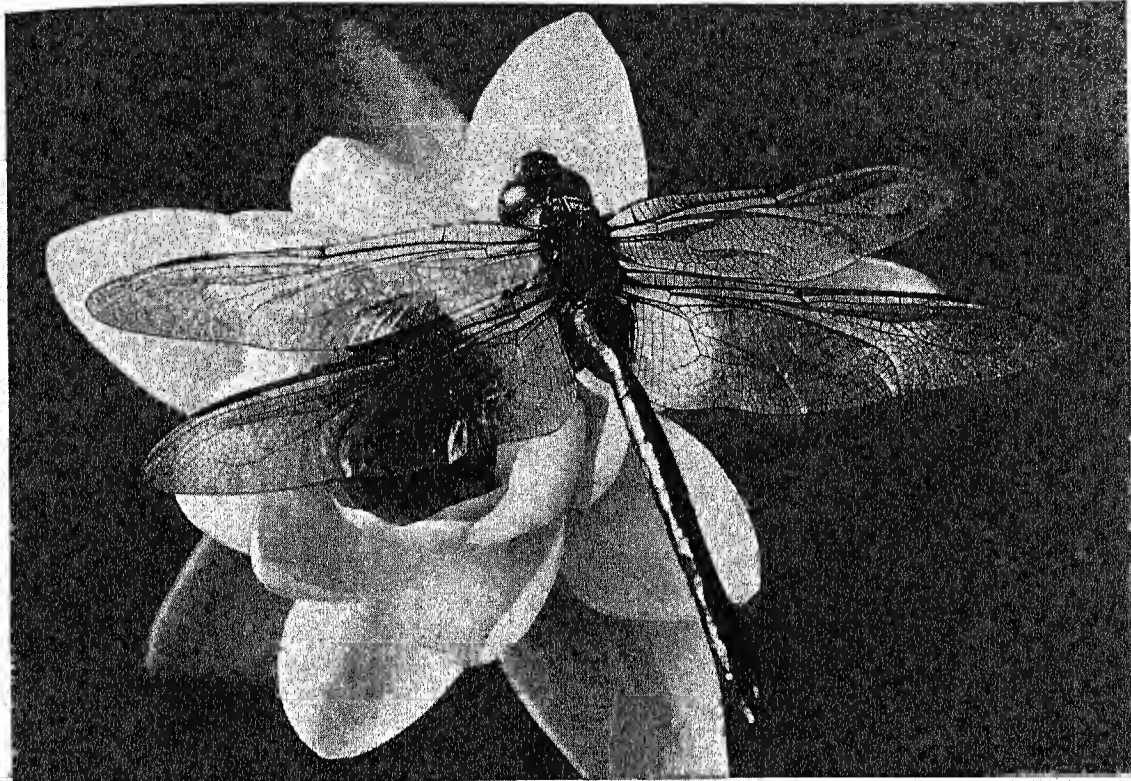
Arriving in a district, the judges, aided by the local bishop and the state authorities, would announce 30 days' grace for all heretics to come in and confess their crime. When that period was up the trial of the accused and unrepentant ones began. The names of witnesses were kept secret, but the defendant was permitted to submit a list of enemies, and none of these might appear against him. Following the frequent practice of the period in criminal trials, torture was often used to force confessions of guilt.

At a grand ceremonial, called *sermo generalis* or *auto-da-fé*, the names of the guilty were announced and punishments inflicted, ranging from fines and excommunication to imprisonment for life or burning at the stake for incorrigible heretics. Since canon law forbade the clergy to participate in bloodshed, the severer penalties were carried out by the state.

The Inquisition reached its height in Spain during the days of King Ferdinand and Queen Isabella, when Fray Tomás de Torquemada (1420-1498) was made inquisitor general for the kingdom. Here the crown exercised almost complete control over the Inquisition and carried it to extremes, often coming in conflict with the authorities at Rome.

The Inquisition was sometimes used as a cloak for political and private revenge, and at times the sincerest inquisitors were misled by fanatical zeal and practiced great cruelties. But on the whole, the institution was a logical product of its time. In those days the church and state were united in the closest bonds, and heresy was considered a crime against both, to be compared only with high treason and anarchy. To the people of the period it seemed as reasonable to punish a man who "plotted against the life of the church," as it would in our day to punish a man who plotted against the existing government.

The Inquisition was chiefly active in southern Europe, and continued in modified form in Spain until 1820. The Congregation of the Holy Office, established by Pope Paul III in 1542 to review the judgments of the Inquisition courts, still exists. It examines charges of heresy, but imposes only spiritual punishments such as excommunication.

OUR SIX-LEGGED *Rivals* for MASTERY of the EARTH

A dragon-fly poised on a water lily. Compare this insect, with its long body and great wings, to one of its tiny wingless cousins—a flea, for example. No other group of animals presents such wide contrasts of shape and habits as do the insects.

INSECTS. The number of insects in the world is almost unbelievable. If we could count all the men on earth, all the four-footed animals, all the birds, and all the fish in the rivers and the oceans, the final total would be small compared to the total of the insects.

If we could pile all the insects on one side of a huge scale and if we could put on the other side all the other land animals, including men, the insects would weigh down the scale.

Whenever men have tried to calculate insects by actual numbers, they have reached sums so staggering that the human mind cannot grasp them. For instance, scientists who were fighting the locusts that plague the island of Cyprus in the Mediterranean Sea destroyed in one year 1,300 tons of locust eggs. Yet the following year the eggs laid by the locusts that had escaped destruction were estimated at 4,000 tons. This amounted to 100 billion individual eggs. This example deals with only one species of insect in one tiny corner of the earth. And there are in the world perhaps as many as six million species.

No insects live in the sea. But on land and in fresh water, wherever life of any kind is possible,

***H**ERE you will read the story of the eternal warfare going on around us between the countless millions of the insect world. You will learn how they get their food, fight their battles, and protect their young, and you will read of the magic that puts wings on the caterpillar, and turns the helpless grub into the busy bee.*

insects thrive and multiply—creeping, flying, burrowing, or swimming. Their success in nature's universal struggle for survival is so great that they

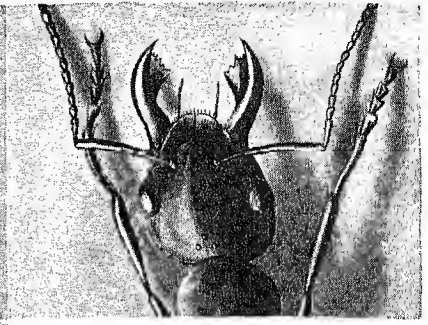
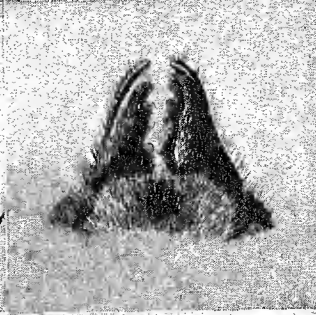
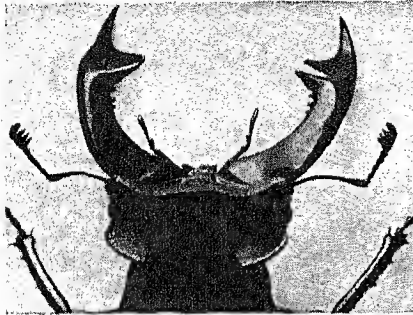
have often been called the rivals of man for the mastery of the earth. In the face of our civilization, which has reduced most other forms of animal life, insects have increased their numbers.

Reasons for Insect Success

Many factors are responsible for their success. Their small size enables them to hide easily. Their amazing power of reproduction tends to replace rapidly the ones that are destroyed. But most important, perhaps, is the extraordinary *adaptability* of the insect tribes. They have been able to develop countless different habits and shapes to fit widely varying conditions of life and to alter their habits to a great degree to meet new conditions.

Some insects join in social groups and carry on the battle of life by dividing their work. In an ant colony, for example, some members specialize in reproduction, some in food gathering, some in fighting. Their interdependence is so absolute that no single member of the group could survive without the coöperation of the others (*see* Ant; Bee). Other in-

THE TOOLS OF THEIR TRADES



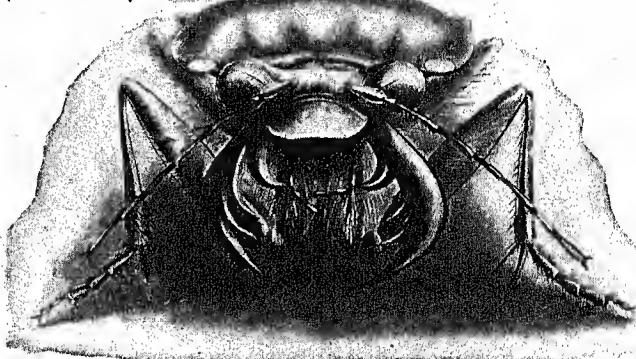
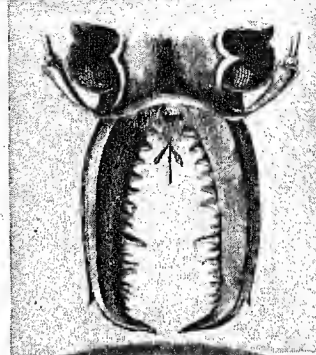
sects carry on the struggle as individuals, even to the extent of preying upon their own brothers and sisters (see Mantis).

The common clothes moth provides a good example of change to meet a new situation. It feeds today solely on man-made materials. We know that it must have existed long before clothes were invented. What did it feed on then? Beetles furnish many other striking instances and problems of this kind (see Beetles).

Imagine yourself a pigmy one inch high pushing out into the insect world to learn its customs at close range. You meet there a guide, perhaps an ant, magically gifted with the power to explain what you see.

"The first law of insect land," the ant will tell you, "is to eat without being eaten. And the second law is to lay eggs and provide for the young. Everything we do and everything we have serves one or the other of those two laws of preservation and reproduction. All the shapes and colors of insects, that seem so horrible or beautiful to you, are not accidents. They all mean something in our struggle to live.

"Since there are so many of us, we have had to learn to eat almost anything in the world. Anything that's alive, or has ever been alive, is food for one kind of insect or another. There are some even that live on wooden furniture, old shoes, and the paper in books—they've learned to do that since you men started making such things. Others, such as fleas, mosquitoes, and certain flies, feed on living men and animals. Still others clean up dead vegetable and animal matter they find lying around.



Like human workmen the busy little people of the insect world have different tools for different purposes. The first picture on the left at the top shows, much magnified, the mandibles of the Stag Beetle. Next are the "scissors" with which the Leaf Cutter Bee does such neat work. On the right are the powerful pincers with which the Wood Ant fights and works. The central picture shows the saws of the Sawyer Beetle, while below we see the picturesque countenance and the hungry jaws of the Green Tiger Beetle.

"But by far the greater number of us feed upon living plants or upon each other. The caterpillar eats the leaf, the young wasp eats the caterpillar, the beetle eats the young wasp, the bird eats the beetle. Then, when the bird dies in some forest tragedy, another beetle comes along and buries him, and the little beetles eat a part of his body, the rest stays in the ground and makes it rich so that another tree can grow whose leaves another caterpillar will eat. That's

the way it goes, always in a circle; one dies so another can live. After all, it isn't the individual that counts, it's the race."

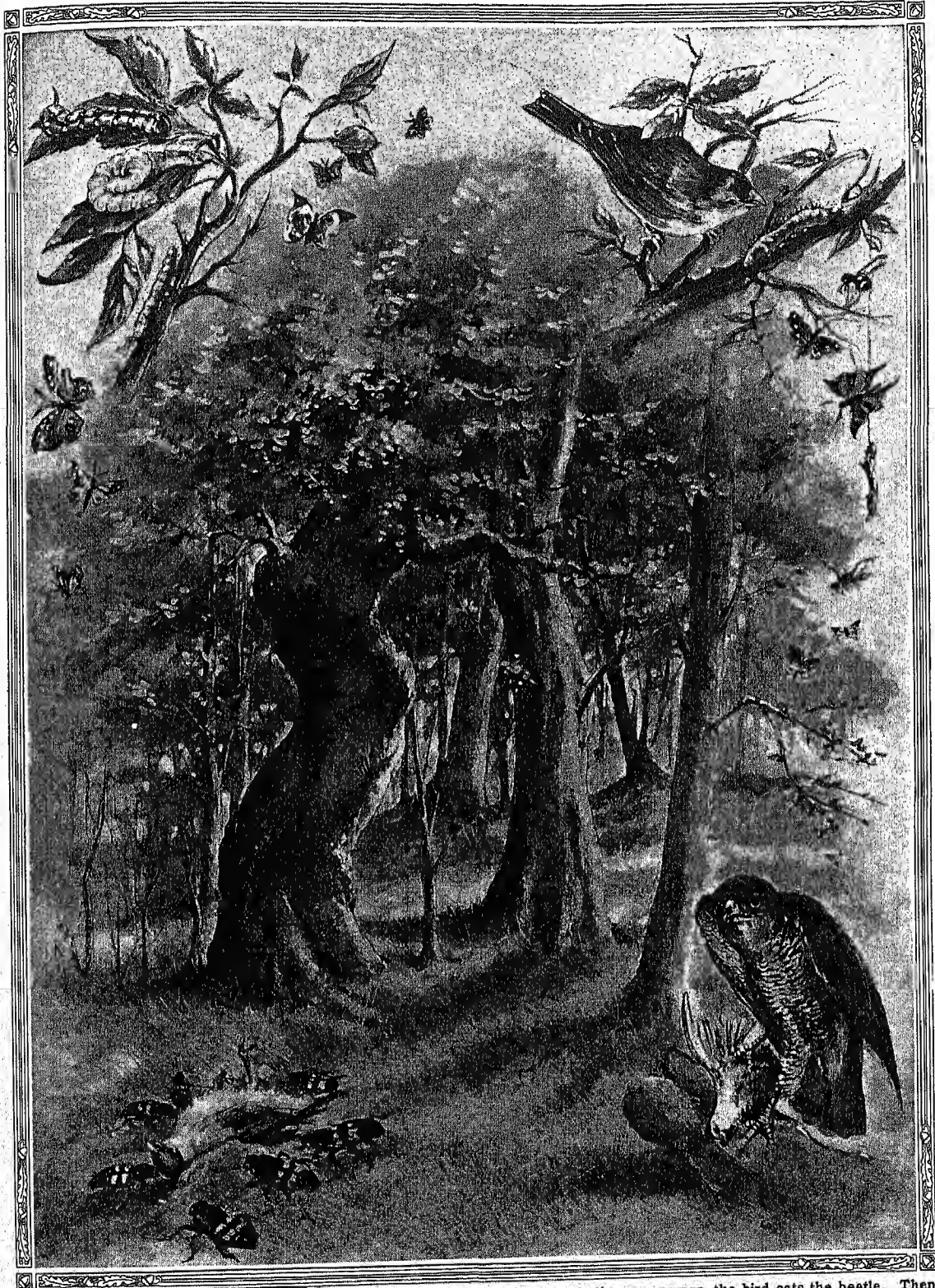
When the wise ant says this, you may perhaps remember the line in one of Tennyson's poems, in which he says of Nature: "So careful of the type she seems, so careless of the single life." The ant continues:

"The character of an insect's mouth-parts depends on what he

eats. Some have strong jaws to tear leaves or bite the bark of trees or gnaw each other. Some have a sucking apparatus to draw in nectar or fruit juices. Some have tiny pointed beaks to pierce the skin of plants or of animals whose blood they drink. Indeed, the mechanisms with which insects get their food are much superior to men's mouths.

"The manner of our life also influences our feet and legs. Some of us have sharp claws for climbing or clinging to the bottom of a leaf, while others have sucker-like hairs on their feet for hanging upside-down on smooth surfaces. Others still have broad flat feet for digging, or huge front legs with great talons for seizing and holding living prey, like that great hypoerite, the praying mantis."

THE CYCLE OF LIFE AND DEATH IN THE FOREST



"The caterpillar eats the leaf, the young wasp eats the caterpillar, the beetle eats the young wasp, the bird eats the beetle. Then, when the bird dies in some forest tragedy, another beetle comes along and buries him, and his remains make the ground rich so that another tree can grow whose leaves another caterpillar will eat."

Here the old ant stops and holds up its own front feet. "I'm a runner and a climber too, you see. I'm made for work. But my queen," it says, bowing its head at the name, "has wings and can fly like the

"But what will interest you most is the armor and weapons we use in protecting ourselves against our enemies. Just feel my back a second," says the ant, stopping short. "Do you see how tough, and smooth,

and springy it is? And the top of my head, too, is covered with the same kind of tough, horny skin. That's made of stuff you call *chitin*. Every insect has more or less of it on his body. The beetles are particularly well protected by it. With many of them it amounts to a solid shell of armor that will turn the sharpest pair of jaws in insect land. The only places on a beetle where I ever could get a hold were at his knees and elbows, or in the soft joints of his stomach. Some beetles can draw their heads and legs close in and laugh at any small bird that tries to pick through their thick shells. Besides protecting us, this chitin covering takes the place of a bone skeleton, such as you have, and helps us to hold our shape.

"As for our weapons, our jaws, of course, are very effective against enemies who are near our own size. For larger foes, insects have a wide assortment of sharp beaks and poison stings, with which they can inflict painful wounds on the biggest

of creatures. The wasps and the bees are the best all-around single-handed fighters. But when it comes to organized warfare, with army formations, massed attack or defense, and all the details of strategy and tac-

great majority of insects."

"All insect tribes that are alive today," it continues, "have survived because they have some special tricks for avoiding destruction. And these tricks all follow

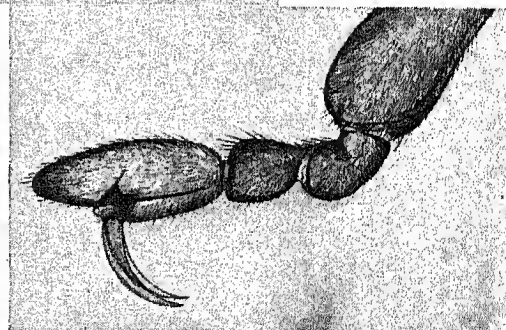
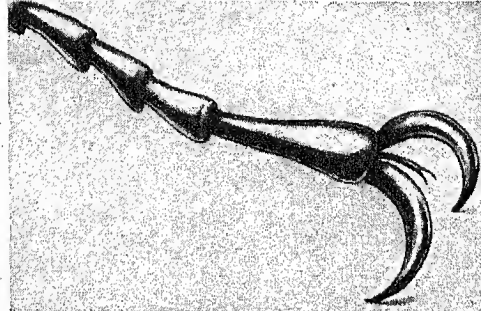
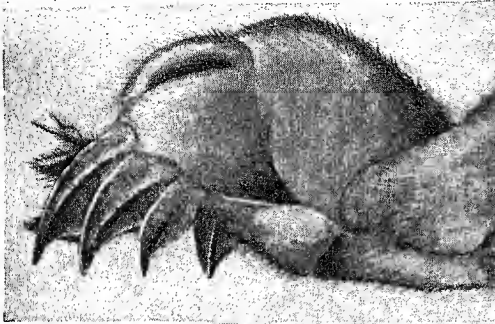
one or more of four systems—numbers, concealment, armor and weapons, and what we may call 'frightfulness', which is another name for bluff.

"The number system is simple. It consists in laying eggs and bringing up children faster than all our enemies put together can eat up. This method is used more or less by all insects, but particularly by such helpless creatures as the scale insects. Fruit growers have found how hard it is to kill these off. You can destroy ten millions of them, but if one escapes, there'll be millions more born inside of a month.

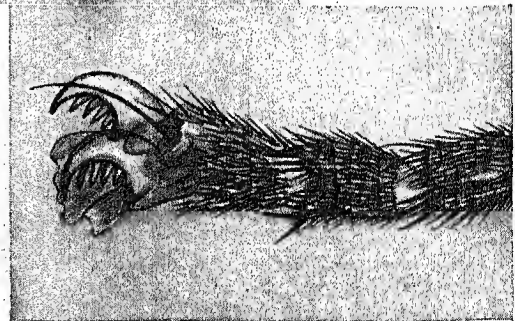
"The concealment method is far more clever. Some insects are positive geniuses at it. The leaf-insect imitates the color and shape of a leaf so skillfully that his own brothers, who are strictly vegetarians, sometimes bite him by mistake. There's a butterfly also that does the same thing, imitating even the stem which attaches the leaf to the twig. This is what you now call 'camouflage'—but it's a very ancient science among insects. Some of us imitate a stick of wood, or the bark of a tree, or a flower blossom. The system works best of all in fooling our two-legged enemies—birds and men—who look for us from a distance.

INSECT STYLES IN FOOTWEAR

The Mole Cricket is the greatest digger for his size in the world. Look at his front foot and you'll see why. With those powerful claws he cuts and scrapes through the earth, scooping it back with that strong broad "palm." That slit at the top of the foot is the Mole Cricket's ear.



Just below the Mole Cricket's foot we see the stag beetle's double claw. The third picture shows the foot of the Ditch Skater that flits over the water of ponds and ditches. The hook is for holding to water plants or to its prey. A fourth picture shows the foot of the Scorpion Fly, which has long spiny legs and grasping claws for clinging tight to its victim.



tics, together with patriotic courage, the reputation of the ant family speaks for itself." There is a certain note of pride in the old ant's voice as it says this.

"The real joke, though," the ant continues, "is the way insect frightfulness or bluff works. You know how the common earwig frightens you men when he

CAMOUFLAGE AMONG THE SIX-FOOTED CREATURES



First, a Willow Beauty Moth blending with the bark of a willow tree. Next, two Indian Leaf Butterflies, one with wings open, the other folded.



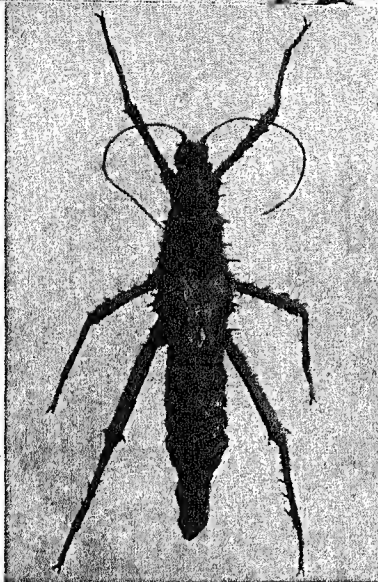
Third, a Lappet Moth, another leaf imitator. Last, a Walking Leaf Insect, probably the best mimic of all. He even fools his relatives.

curls up that terrible-looking tail of his with its snapping pincers? That's bluff, pure and simple. He couldn't possibly hurt anything with that, yet many an earwig owes his life to the terror he inspires.

"The stag beetle and the rhinoceros beetle look so fierce with their huge horns that they scare other insects and even birds away. But if you should put your finger between the stag beetle's big pincers, he wouldn't know what to do. He certainly can't pinch hard enough to do any harm. There are dozens of examples of such frightfulness. Some harmless insects even imitate the shape and color of the stinging kind and so escape. Certain flies, for instance, mimic bees.

"Did you ever hear of the bombardier beetle? He's the real inventor of the poison-gas artillery. When a larger beetle or a bird pursues him, he fires a little cannon he carries on his tail. It goes off with a 'pop' and forms a little cloud of blinding gas, which covers his escape. The puss-moth caterpillar can also squirt out poison clouds.

"But if we have a lot of bluffers, we have also some really dangerous characters in insect land, which attack even four-footed animals and kill them single-handed. There is a huge African locust which catches and kills mice and small birds for food.



This little creature known as "Gray's Spiny Stick-Insect," looks so much like the thorny bushes on which it feeds that its enemies have trouble in finding it. It's nearly a foot long.

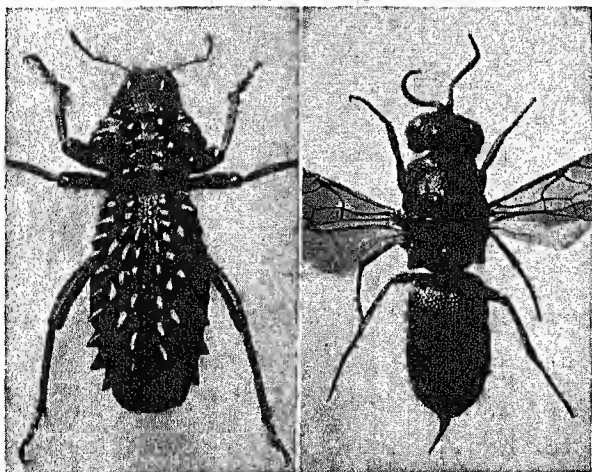
And if I had time, I'd show you in the lake over there how the giant water-bug can kill small frogs and fish, seizing them in his powerful front legs and plunging in his deadly beak. But I must get back to my work." And with these words the old ant hurries away.

In the Fairyland of Change

If the ant had had time he might have explained that wonderful feature of insect life we call *metamorphosis*. With very few exceptions, insects grow from eggs. Most species after hatching from the egg do not resemble their parents at all. They may be smooth wormlike creatures, such as the maggot of the bee or the fly, or they may be hairy like some caterpillars, or big fierce-looking grubs like the young of the tiger-beetle. At this period of its life, the insect is called a *larva*, and its only duty is to eat and grow. The

period may last only a few days, as is the case with bees and flies, or it may extend over years, as in the case of the cicada or "17-year locust." This period may be spent burrowing in the ground, hiding in holes in the trunks of trees, swimming in the water, or crawling about in the open air—each according to its kind.

In due time, however, the insect enters the *pupa* stage or *chrysalis* stage (as it is called in the case of butterflies

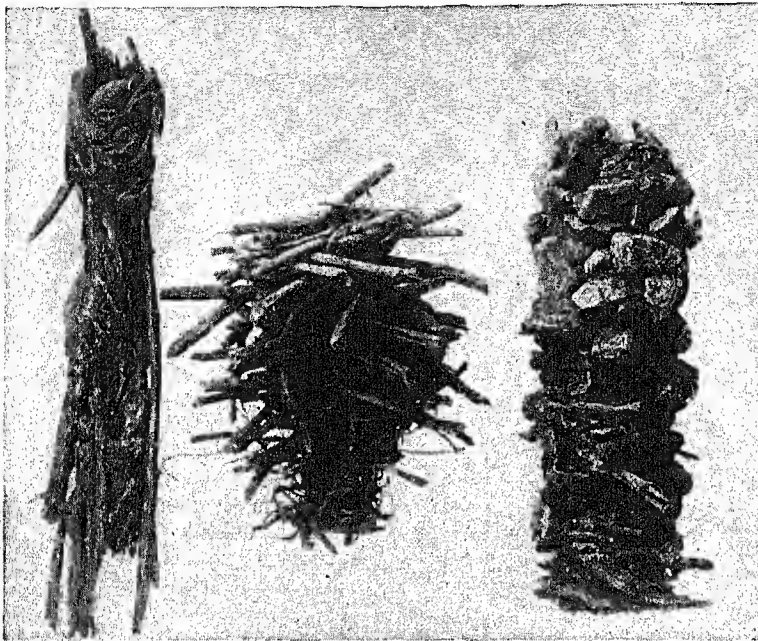


On the left is a species of Weevil whose "thorns" make him an unpleasant mouthful. On the right is the Ruby Wasp, which is protected by an extremely hard shell.

and moths), which is a period of sleep. For this purpose many larvae, such as caterpillars, form a sort of silken cradle called a *cocoon*. During this sleep, the whole shape and structure of the pupa

living young. These tiny green creatures also illustrate the practice, not uncommon among insects, in which the females bear young for many generations without the males. This is called *parthenogenesis* (from the Greek words meaning "virgin birth"). Furthermore, there are insects which produce young while still in the larval stage, and others while still in the chrysalis or pupa stage.

FORTIFIED CASTLES OF THE CADDIS FLIES



In their larval stage, the Caddis Flies live under water and cover their soft white bodies with silken tubes, to the outside of which they attach various materials—sand, twigs, bits of stone, and so on—as a means of protection. Different species have different protective materials, as shown in the illustration.

changes, and when it awakes and bursts out of its old skin, it has become for the first time a fully-developed insect (*imago*) like its parents. The ugly caterpillar, for instance, has turned into a handsome butterfly or a moth.

But there are many strange variations and exceptions to this law of metamorphosis. Some insects, like the oil beetles, pass through two or more larval forms before they become pupae, and the mayflies undergo an additional change after they leave the pupa stage. There are, on the other hand, many groups of insects, such as the grasshoppers, locusts, crickets, and all true bugs, in which the young resemble the parents just as soon as they hatch from the eggs, needing only to grow larger, and to develop wings, if they are of the winged kind. Such young insects are called *nymphs* and not larvae. During the growing period, nymphs shed their skins several times. This is necessary because the chitin covering of an insect cannot stretch.

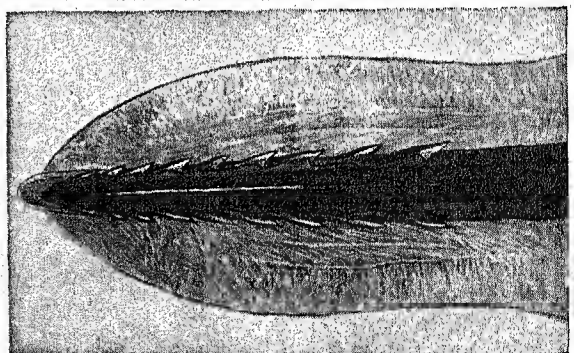
There are exceptions also to the egg stage, for the young of some insects are born alive. Such insects are called *viviparous* (Latin *vivus*, "alive," and *pario*, "bring forth"), to distinguish them from egg-laying insects, which are called *oviparous* (Latin *ovum*, "egg"). Plant lice or aphids have the curious habit of sometimes laying eggs and sometimes producing

The social groups of insects—ants, wasps, and bees—rank highest in intelligence. These have learned the lesson of coöperation, which reduces the struggle for existence to its easiest terms. With them, the spirit of the hive or nest rules supreme over the willing workers. From the earliest times, men have found inspiration to devotion and self-sacrifice in the lives of these ingenious insects. (See Ant; Bee.)

In general, it is in the nest-building habits of insects that their highest skill is shown, rivaling many of man's cleverest accomplishments. The carpenter bee, for instance, bores into the solid wood and builds cells for its eggs. The mason wasp constructs a beautiful home of mud. There are spinners of silk and makers of wax, upholsterers, workers in wood pulp and tree gums, and hundreds of other special trades and professions represented in the insect world.

Most of these nest builders store up food for their young. It may be honey, or pollen, or the bodies of

THE SHARP "SWORD" OF THE BEE



A Bee's sting feels fully as big as this when you get it into your bare foot, but here it is much magnified of course. Those little barbs are what make it stick. Connected with this weapon is the poison gland which makes the sting hurt so.

other insects killed for this purpose. Some wasps even store up living insects, after paralyzing them with their stings, so that their young may have fresh food when they hatch from the egg.

What happens to insects in the winter time? Most of them die, leaving eggs or half-developed young to await the warmth of spring under ground or in some other protected place. In certain species, like the social wasps, the female sleeps through the cold weather and lays the eggs for the new generation as soon as warm weather comes. The colony life of ants and bees, however, continues all the year around.

How Insects are Made

The chief distinguishing feature of insects is that all of them have six legs, which gives them the scientific name *Hexapoda* (from the Greek *hex*, "six," and *podes*, "feet"). Their bodies are always divided up into segments or rings. There are a great many creatures which closely resemble insects and are often mistaken for them—for instance, spiders and scorpions, which have eight legs; centipedes, with dozens of legs; mites and ticks, which have sacklike bodies unbroken by segments.

Insects, however, belong to the larger group of creatures with jointed legs called *Arthropoda*. This includes not only centipedes, spiders and scorpions, but shrimps, crabs, and lobsters, as well.

The name "bug," which is often applied to insects in general, really belongs to certain special kinds of insects only. Among other peculiarities which distinguish the true bugs from other insects is the beak with which the members of this order suck the juices of plants as well as the blood of animals.

The body of an insect is divided into three parts—head, fore-body or thorax, and hind-body or abdomen. The head bears the delicate feelers or antennae, the mouth parts, and the eyes. The sense of smell is situated in the antennae. There are two sorts of insect eyes, the large compound kind, made up of a great number of separate facets or lenses, and the simple eyes or *ocelli*. Many insects have both kinds, the ocelli being situated between the two prominent compound eyes. In certain mosquitoes and gnats the ears are found in the antennae, but in most insects they are not on the head at all, but between skin-layers

METAMORPHOSIS



Here are the egg, larva, and pupa of the Honey Bee, illustrating the three stages through which most insects pass before they become real "grown-ups."

of the body. Crickets and long-horned grasshoppers have ears on the shins of their fore legs.

The mouths of insects are supplied usually with *mandibles*, or pinching jaws, and *maxillae*, or biting and chewing jaws. The size, shape, and arrangement of these mouth parts vary greatly in different species. In the true bugs, it is the mandibles which are modified into sucking beaks.

The thorax bears the three pairs of legs and the wings, when these are present. The typical insect has four wings, but in many species, such as the housefly, they are reduced to two, and in many others they have disappeared altogether. In some insect groups, the males only have wings, in others only the females. Certain species, like the plant lice, develop wings only under special conditions of diet or weather. Often, as in the beetle tribe, the front wings of insects have become armored wing-covers, which protect the delicate rear wings when the latter are not being used in flight.

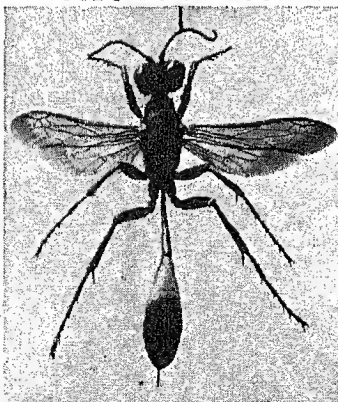
The abdomen, consisting of several segments and joints, contains the digestive tract and in females the egg-laying apparatus or *ovipositor*. This is often very delicate and complicated, enabling the insect to bore into the ground, or into trees, or through the skins of other insects to lay its eggs. The poison sting, when present, is situated conveniently at the tip of the abdomen.

Insects have well-developed brains and nervous systems. A simple contracting heart-sack provides for the circulation of blood. They have no lungs and do not breathe through their mouths. Air is drawn in through tiny holes or *spiracles* in the body-segments, and passes through an intricate system of branching tubes or *tracheae*, carrying oxygen direct to all parts of the body.

The muscle system in insects is perhaps as delicate and complicated as in any higher animal. Scientists with microscopes have counted as many as 4,000 muscles in the body of one small caterpillar.

The collection and study of insects is fascinating and profitable work for old and young. Insects are best captured by using a butterfly-net. They may be killed

BUILT FOR BATTLE



The Red-banded Sand Wasp with its long slender waist and its poison dart is one of the most skilful fighters of the Insect World.

SOME GEMS OF THE INSECT WORLD



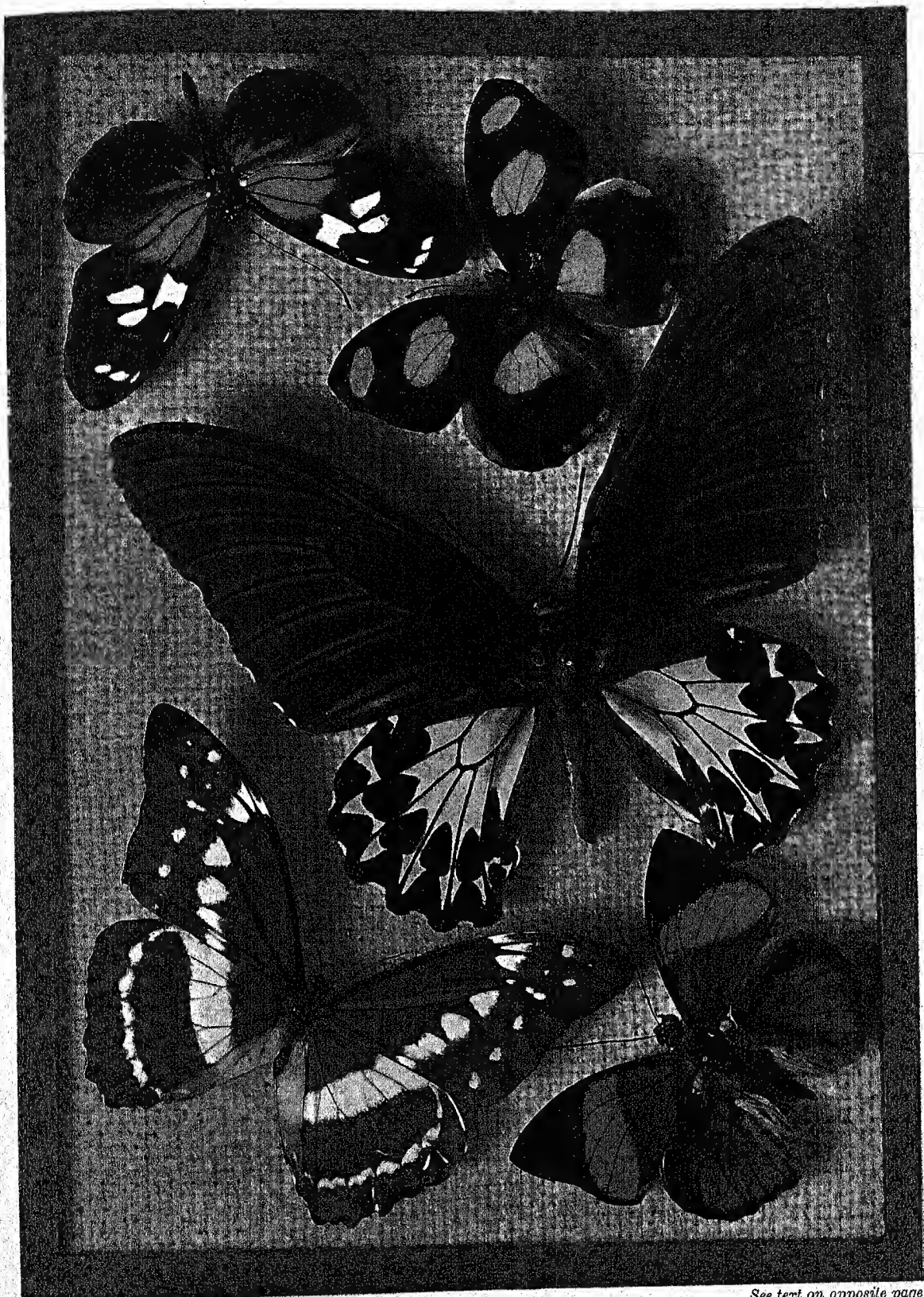
KEY TO COLOR PLATE

OF all insects the butterflies wear the most brilliant costumes, especially those dressed for tropical climates. The photograph on the opposite page was made in natural colors from actual specimens gathered in distant lands. Each is identified through the numbered key-picture here at the left.

In the high forests of Peru was caught *Heliconius burneyi* (1), which like most other tropical butterflies owns no popular English name. His orange-spotted neighbor, *Catonephela numilia* (2), came from the Amazon valley. A Dutch collector in the island of Sumatra, East Indies, captured the

great "bird-winged" butterfly (3) called *Ornithoptera vanderpolli*. The blue beauty of *Morpho cypris* (4) is characteristic of a famous tribe some members of which have a wing-spread of eight inches or more. This one began life in the lofty woodlands of the Republic of Colombia. When *Agria claudiens* (5) arrived in this country he was tagged from Para, Brazil.

Why have butterflies developed such brilliant colors? There are many answers and much that still puzzles scientists. Butterflies of the heliconid type (1) contain bitter liquids distasteful to birds who quickly learn to recognize the warning colors and to leave them alone. Some butterflies, like numbers 2 and 4, exhibit their bright colors only in flight when they may serve to attract a mate. At rest on a twig with wings folded up over their backs, showing only the dull brown under sides, these butterflies are extremely difficult to distinguish from their surroundings.



Direct-color photograph, actual size

See text on opposite page

SOME GEMS OF THE INSECT WORLD

without injury by dropping them in a glass jar filled with the fumes of benzine, alcohol, ether, chloroform, carbon disulphide, or potassium cyanide. Once they are dead, the insects should be spread out in their natural attitude on a soft board, and held in place with fine pins until they dry. They may then be mounted on long pins thrust through the thorax and into the bottom of a shallow box. When mounted, labels bearing the name of the specimen should be neatly pasted underneath. A small magnifying glass is a great aid to insect study.

About 650,000 species of insects have been collected, named and described by scientists. But by far the greater part of the insects which inhabit the world are still unknown to science. Hundreds of new species are discovered every year. Estimates of the probable number of species run from three to six million.

As a class, insects are found in virtually all parts of the earth, many species existing inside the Arctic circle. But insects flourish best in warm countries. In the tropical forests of Africa insects of every kind swarm in such numbers that, as the explorer Henry M. Stanley said: "There must be no sitting or lying down on this seething earth. Venom, fury, voracity, and activity breathe around you."

From man's point of view, insects may be divided into the harmful and useful classes. Many kinds, like grasshoppers and locusts, plant lice, scale insects, cotton weevils, and the caterpillars of nearly all moths and butterflies do an immense amount of damage to trees, crops, domestic animals, and food stores, estimated for the United States at two billions of dollars annually. Others, such as cockroaches, flies,

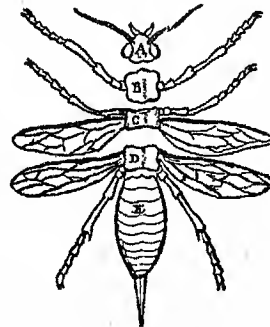
fleas, mosquitoes, and gnats, annoy men and animals and even spread some of the most dreaded diseases of mankind, such as malaria, yellow fever, and that frightful scourge, bubonic plague.

But there is another side to the story which is too often overlooked. If it were not for bees and other honey-seeking insects, which carry the fertilizing pollen from flower to flower, it would be almost impossible to raise many kinds of fruit and other crops. If it were not for the beetles and wasps and others, which destroy every year vast numbers of the harmful insects, our fields and gardens would be overrun with pests of all kinds. Many of the insects which burrow in the ground do a great work as cultivators, turning over and airing the soil. Countless scavenger insects help the bacteria in getting rid of refuse for us. On the whole, these friends of man go a long way toward paying off the debt of his insect enemies. Besides, certain insects manufacture substances of great value, such as silk, honey, wax, dyes, and shellac. Among all the insects, however, men have found only

two kinds that could be domesticated with profit—the silk-worm and the honey bee.

Insects appeared on earth long before mammals. Some scientists believe they have identified insect remains in Silurian rocks (see Geology). It is certain that the forests of the Coal Age contained many insects, some with a wing span of two feet. The chart with the article on Animal Kingdom shows how they developed from primitive types of ringed worms. Measured by the scale of perfection of instincts, they represent the highest form of invertebrates (animals without backbones).

PARTS OF AN INSECT



The typical parts of an insect are shown: the head (A); the first joint of the thorax (B), bearing the front legs; the second joint (C), bearing middle legs and front wings; the third joint (D), bearing hind legs and second pair of wings; the abdomen (E), bearing the egg-laying apparatus and the sting when present.

How Science Classifies the Insects

The classification of insects for scientific purposes varies as new species are discovered. The following list of orders is one recently approved by American entomologists, as the students of insect life are called; it is based largely upon the structure of the wings and mouth parts. For each order one or two type examples are given.

- | | |
|--|---|
| Order | Order |
| I. <i>Thysanura</i> , no wings (examples are bristletails, spring-tails, fish moths). | X. <i>Physopoda</i> (thrips, tiny creatures usually inhabiting flowers). |
| II. <i>Ephemera</i> , six-winged, two adult stages (mayflies). | XI. <i>Hemiptera</i> , piercing beaks (ordinary lice, water boatmen, cicadas, and all other true bugs). |
| III. <i>Odonata</i> , four wings, aquatic larvae (dragon flies). | XII. <i>Neuroptera</i> net-veined transparent wings, pupae free (ant lions, dobsons). |
| IV. <i>Plecoptera</i> , folding wings, breathing gills in the larvae (stoneflies). | XIII. <i>Mecoptera</i> , (scorpion-flies, body shaped like scorpion). |
| V. <i>Isoptera</i> , four wings alike (termites or white ants). | XIV. <i>Trichoptera</i> , aquatic larvae, build movable houses of sticks or stones (caddis flies). |
| VI. <i>Collembola</i> (book-lice, tiny insects living in books). | XV. <i>Lepidoptera</i> , scaly wings (butterflies and moths). |
| VII. <i>Mallophaga</i> (bird-lice, parasites often found on poultry). | XVI. <i>Diptera</i> , two wings (common flies, gnats, mosquitoes). |
| VIII. <i>Euplexoptera</i> , rear wings delicate and folding up in complex manner beneath small wing-covers, some wingless (earwigs). | XVII. <i>Siphonaptera</i> , piercing jaws, no wings (fleas). |
| IX. <i>Orthoptera</i> , straight wings (grasshoppers, roaches, crickets). | XVIII. <i>Coleoptera</i> , sheath wings (all beetles). |
| | XIX. <i>Hymenoptera</i> , four membranous wings (bees, wasps, ants). |

Insect Pests That Cost Man Billions of Dollars Yearly

IN 1869 a gust of wind swept a small pasteboard box through the open window of a professor's study in Massachusetts and scattered the contents amid the shrubbery. In 1892 a little grayish beetle flew across the Rio Grande and settled on a cotton plant in Texas. In 1909 a shipment of infested broom corn from southern Europe was left lying in a ramshackle barn near Boston. These trifling events, unchronicled at the time, led to stupendous results.

Each occurrence marked the beginning of a fresh plague to American agriculture. Each brought new insect raiders that allied themselves to native pests to carry on a war that is causing annually more than two billions of dollars worth of damage in the United States, or in other words, a war that renders useless each year the labor of a million men.

The New England professor had imported some gipsy-moths from central Europe to study their possible fitness as producers of silk. The few caterpillars that escaped from captivity in 1869 established themselves on the trees, increased in numbers, and within 20 years were doing such serious damage in the neighborhood that the state of Massachusetts became alarmed and began a battle against the pest. Since 1905, when the Federal government opened war on the gipsy-moth, everything possible has been done to suppress the insect, but it has spread into all the New England states, doing enormous injury to shade, orchard, and forest trees by stripping them ruthlessly of their tender green leaves.

The Cotton Boll-Weevil

When the cotton boll-weevil crossed the Rio Grande to the southern tip of Texas in 1892, government entomologists perceived the danger at once. Had their warnings been heeded, the pest might have been stopped in its tracks. But the Texas legislature failed to act until the boll-weevil had entrenched itself so strongly that eradication was a hopeless task. Year after year the weevil won new territory until it ravaged the entire cotton-producing area of the South, in some years causing damage amounting to \$300,000,000. (See Weevils.)

An unwelcome immigrant that arrived

in broom corn from Europe was the devastating corn borer. Beginning its attack on the sweet corn near Boston, it started a conquering march inland. Another detachment invaded the country from Canada via Lake Erie. The European corn borer now plagues a broad belt of territory from Cape Cod to Lake Michigan, an area of more than 200,000 square miles. More than 225 kinds of plants suffer from its destructive appetite, but the preferred diet is corn, of any variety or flavor. Through a single appropriation of Congress in 1927, this little moth cost the government, \$10,000,000, which was spent not in the hope of exterminating the

insect, but to keep it from overrunning the country.

Meanwhile, the long established pests continue their destruction. The Hessian fly, terrible ravager of the wheat fields, causes the appalling loss of \$100,000,000 in some years. The board bill of the chinch bug amounts to \$46,000,000 worth of corn, wheat, and oats each year. The codlin moth, with its love for apples and pears, costs the country upward of \$20,000,000 annually. To the aid of these master crop criminals come the plum curculio, the peach borer, the corn root aphid, the grasshoppers, the weevils, and dozens of other pests, all of which cause a colossal and unnecessary waste.

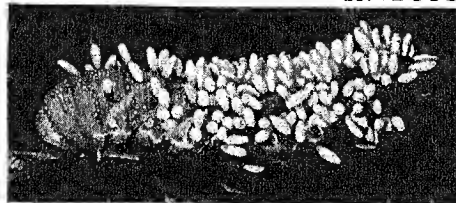
Pests of Foreign Origin

Of the 100 or more species of enormous economic importance, more than half are of foreign origin. The Argentine ant, enemy of field crops and stored foods, came as a stowaway in a cargo entering New Orleans in 1891. The alfalfa weevil, introduced with soil about the roots of imported plants sent to Utah in 1902, is damaging the alfalfa crop in Western and Pacific coast states. The oriental peach moth, a serious

pest of peaches, quinces, and certain other fruits, came from Japan in 1913 on a lot of cherry trees presented by the city of Tokyo to the city of Washington. The pink bollworm, a dreaded enemy of cotton, came in carloads of cotton seed imported from Mexico in 1916.

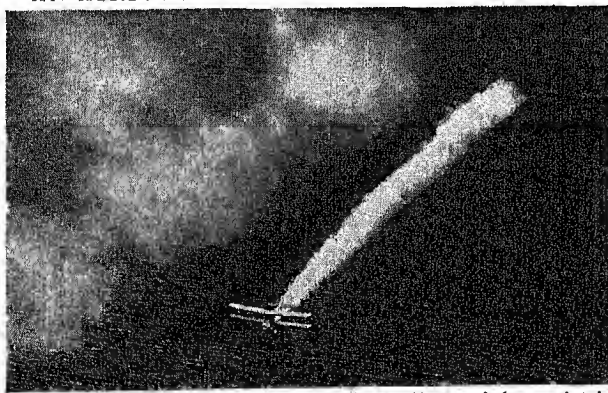
In one year alone, 1920, three important immigrants were first discovered, the satin moth in Massachu-

NATURE'S CONTROL OF INSECTS



This Sphinx Caterpillar has been destroyed by Ichneumon Fly larvae that grew from eggs laid within its body. The white objects are cocoons spun by the larvae on the dead caterpillar.

AN AIRPLANE ATTACK ON INSECT PESTS



While nature sends parasites to prey on insect pests and thus maintain the "balance of nature," man makes a direct attack on such ravagers as the boll-weevil, dusting fields by airplane with calcium arsenate.

setts, the Asiatic beetle in Connecticut, and the Mexican bean beetle in Alabama. The Satin moth is a serious pest of poplar and willow trees, with importations of which it was accidentally introduced from Europe. The Asiatic beetle, whose grubs destroy lawns, has since spread to parts of New York and New Jersey, and is also present in the state of Washington. The Mexican bean beetle has invaded the Eastern and Southern states and feeds voraciously on the leaves of all kinds of crop and truck plants.

Until the Federal Plant Quarantine Act was passed in 1912, the United States had no defense against the insects that came in from abroad. Inspectors are now maintained at ports of entry to keep out the foreign pests. These plant-pest policemen examine all seed, fruit, and plant products, even the baggage of passengers. Infected material is destroyed or thoroughly fumigated. Still, in spite of the vigilance of inspectors, every now and then another destructive pest is brought in from foreign lands.

In combating these pests, the government and state entomologists wage a strategic war, one in which no quarter can be given, no armistice declared. If the alien enemy has just arrived and if its area of residence is limited, a campaign of eradication is first attempted. The most notable instance of this was the prompt suppression of the Mediterranean fruit-fly in Florida. This insect had long been known and hated in other lands. It attacks practically every fruit crop of value to man. It invaded the Hawaiian Islands in 1910, causing a fearful loss to fruit growers. Early in 1929 it was discovered in Florida, having been introduced possibly from Bermuda.

State and federal entomologists united for the battle. Congress made available \$4,250,000 to aid in the fight. All Florida was put under quarantine. Fruits and vegetables harboring the pest were destroyed, as were abandoned and rundown orchards. New poison sprays were developed and applied. The clean-up campaign was vigorous and complete. By the end of the summer not a single "Medfly" could be found in Florida, despite diligent search.

Other Methods of Fighting Pests

Where eradication is impossible, mechanical and cultural methods of control often hold an insect in check. The dusting of cotton plants with calcium arsenate, especially when the dust is scattered from an airplane, has given relief from the boll-weevil. Against the corn borer the best weapon is disposal of all trash that would furnish it food or shelter.

In addition to such artificial measures, entomologists are relying more and more upon what is known as the biological method of pest control. When an insect is accidentally introduced into a new country

and finds the climate favorable, it generally increases beyond all bounds. In its native land it is held in check by numerous natural enemies. A new country is a land of opportunity for the insect, because its parasites have been left behind. If the "balance of nature" could be restored, if the enemies which hinder the insect's rapid development could be imported and let loose against it in its new world, the insect would cease to be a troublesome pest.

Remarkable successes have resulted from this

method, as well as some disastrous failures. Pitting insect against insect is no easy task. It requires tremendous study and the utmost care to exclude any parasite which itself may become a pest. The importation of an Australian lady-beetle in 1889 to kill off the fluted scale, fearful pest of the citrus trees in California, was one of the first applications of this method (see Scale Insects). It was immediately successful, and inspired numerous attempts to destroy other pests by means of their natural enemies.

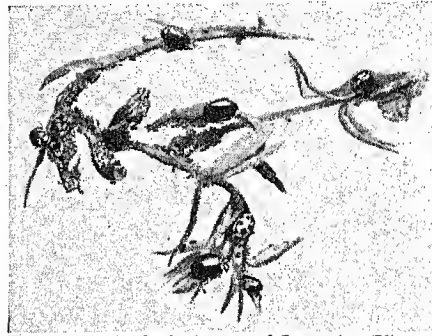
In Hawaii, equally brilliant results were obtained against the sugar cane leafhopper and the sugar cane weevil borer by importation of parasites. In Italy the mulberry scale was quickly controlled by *Prospaltella*, a minute wasplike parasite introduced from America.

Biological control has become an important part of the work of the United States Bureau of Entomology. The extensive introduction of enemies to prey on the gipsy and browntail moths has met with considerable success. Many parasites have been established in America to combat the Japanese beetle and the European corn borer. A laboratory in California raises millions of lady-bugs to war against mealy bugs that threatened to destroy the orange groves. The beetles are "bottled" in gelatin capsules and delivered to the growers for release in infested trees.

The damage insects do to crops is not confined to what they eat. Just as malaria and yellow fever are spread from man to man by blood-sucking insects, so are many plant disorders transmitted by the bites of insects. The mosaic disease of tobacco and tomato, potato leaf roll, the "yellows" of alfalfa, and many other ailments are spread from plant to plant by aphids and leafhoppers.

Man imagines himself to be the dominant living power on earth. But by creating civilization and with it the need for abundant crops to feed city populations, he has laid his dominion open to deadly attack from the insect world. Able to reproduce by millions in the span of one human generation, and endowed with voracious appetites, the insects easily could rock his throne by cutting down his food supply, unless held constantly in check by unrelenting warfare.

A FRIEND OF GARDENERS



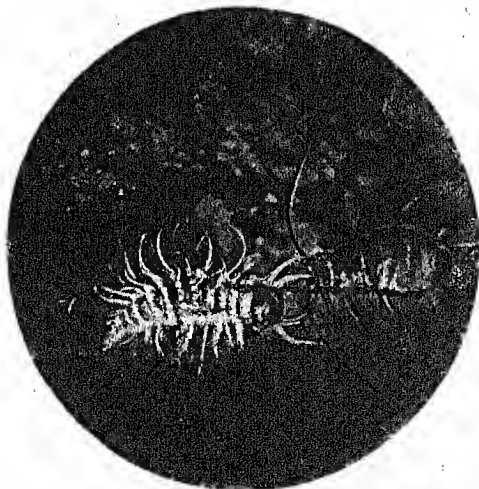
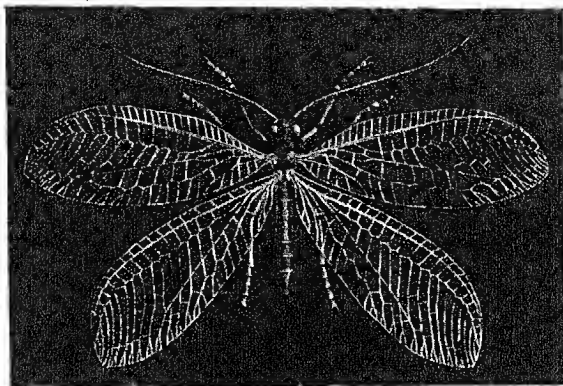
Encourage the Lady-bugs and Lacewing Flies to visit your garden, for they and their larvae greedily devour the destructive plant lice, but do no harm to the plants.

Some Mysteries of Insect Life

HAVE you ever thought, when you have watched an insect creep along a flower or leap into the air or disappear into the earth, that you are watching a mystery which no man who ever lived has yet been able to understand? This little insect, which you can crush out of existence with your finger, is as wonderful as the stars.

Sit in the twilight of some summer evening, and watch the winged procession of the lacewing flies that have been called the loveliest insects in the animal kingdom. The body of this fly is a pale emerald green; its lacelike, silvery wings are iridescent with lovely hues; its eyes are veritable living jewels, sparkling one moment like burnished gold, the next moment like rubies of deepest crimson.

We look up at it for a moment; we say to ourselves, "What a beautiful thing!" and it is gone. But there has flown past us in that moment a wonder that no man knows. That little lacewing fly will presently settle on a leaf, will press against it, and eject from its body a drop of sticky fluid. The drop of fluid rests upon the leaf, and out of it this little mother draws a thread almost too fine for us to see. The thread hardens in the air, and on the top end of the hardened thread, the mother lacewing lays an egg. We go about our business, and the earth spins around seven times and then out of the egg at the end of the thread creeps a living thing. It creeps along the thread towards the leaf, and on the leaf is a giant—a creature twice as big as itself, an evil thing that eats up the life of roses and destroys our gardens. But the little stranger is not afraid. It has just come into the world and has never met a living thing before, but it grips this destroyer of roses, wrestles with it, crushes it, and in less than half an hour throws on one side the empty shrunken skin of its first victim.



It's easy to see from the upper picture how the Lacewing Flies get their name and why they have been called the loveliest of all insects. The center picture gives a magnified view of a Lacewing egg standing on its silken stalk. The third picture is a magnified photograph of a Lacewing larva (on the left) attacking a Green Fly.

We need not claim this larva as a conqueror, nor attribute to it any virtue; it is enough to see what happens. Its first aphid gives it an appetite for more, and it creeps about destroying them until, by the time it is ten days old, it gobbles up 30 in an hour, and by the time it is 12 days old it will eat an aphid every minute. It is a cannibal, for it will suck the eggs of other

lacewing flies—a fact which may explain why the mother lays her eggs at the end of a thread. Perhaps the little mother knows that her children will eat the eggs upon the leaf, but will not climb the thread. That is a difficult journey, the first journey of a lacewing larva in the world, and it goes that way only once.

At 12 days old the larva draws itself up like a ball on the edge of a leaf, spins something very much like a piece of delicate silk, and wraps itself up from the cold. In an hour or two it has changed into a round cocoon, like a pea, and on the edge of the leaf it lies still for 16 days. Then, from within, the little ball is opened, a round lid lifting, and out comes a lacewing fly.

"It is surprising," one naturalist tells us, "how so large an insect can develop in so small a cocoon, but immediately it appears upon the surface of the leaf its wings begin to shake out their folds, and a few minutes later we see the insect developing in all its charming hues. Its bright green body, its gauzy and iridescent wings, and its sparkling eyes—together with its abominable characteristic of

producing a vile odor—have all been acquired in some mysterious way during the 16 days while it was crushed within its cocoon upon the leaf. How the magic was performed is a secret hidden deep within the pages of Nature's book."

It has taken five weeks to make this tiny creature: 7 days in the egg, 12 days—12 creeping, killing days—

as larva, and 16 days in the cocoon, where something happened which all the wisdom of the world has not been able to explain.

That is the tale of the lacewing fly. How many hours of summer days we have sat watching that other little fly, which fixes itself in a point in space and beats its wings so fast that it seems to be perfectly still, until suddenly it darts to another point not far away and rests there, seemingly still again, except that we know it has nothing to rest on, and is holding itself up by the marvelous beating of its wings! It is the hover-fly, one of the wonderful little beauties that make a garden in summer a marvelous place to be in. Out of the egg of the hover-fly creeps a tiny grub, as long as the 16th part of an inch, and with neither eyes to see nor legs to walk. Yet this blind and creeping thing has a strength that we can hardly believe. It travels down a stem, and by chance an aphid touches it. It cannot see, it has had no experience of the world, it has hardly begun to feel what it is to be alive; yet this tiny grub pounces on its prey, racing after it by means of the rough edges of its skin. This is what one observer writes of it as he has seen it happen:

"Instantly the grub thrust its head forward, and a moment later it was standing upright on the tail-end of its body with the aphid elevated in the air. In this attitude the little grub held the aphid for over an hour while it sucked its juices, and this in spite of the fact that its victim was much larger than itself, and continually struggling to escape. It then cast away the empty skin of the aphid, and rested for a while. During the first day of its existence it captured and ate two half-grown aphids and two smaller ones, and day by day, for ten days, its appetite increased in an astonishing manner."

Ten days pass away, ten days of hard feeding, and then this grub hangs to a leaf and stays there another ten days. Its skin is hardening as it hangs, and at last breaks, and out of it, shining in black and yellow bands, comes a little hover-fly.

One more peep at the wonder of insect life. We will take the hornet-moth, laying her little brown eggs on the bark of a tree. One day the caterpillar creeps out of the egg, and, instead of

THE HORNET-MOTH



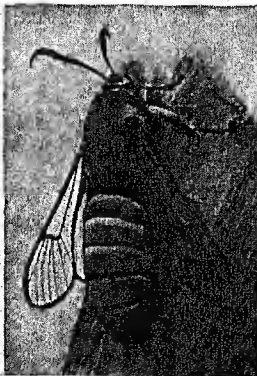
Eggs of the Hornet-Moth



Larva eating into a branch



Looking out into the world



Now it has its wings

setting out in search of aphids, this little creature begins to burrow into the trunk of the tree, boring its way until it reaches the center where it eats a tunnel along the trunk several inches long, and widening as it lengthens. It has found its home. Here it grows and lives perhaps two years, never leaving its dark and narrow house, but taking care to guard itself against invaders by blocking the end of the tunnel with wood scrapings held together by silklike threads, spun by the caterpillar and woven with the wood to make a barrier. Thus guarded, the larva lives until it is full grown, and then, as if it were making up its mind, it turns around and faces its front door! It is as if this strange thing knew what was about to happen; and perhaps it does, for now that it has turned around it molts its skin and becomes a chrysalis. *Had it not turned before, it could not do so now, for in its new coat, hard and brown, it could not possibly turn around in such a narrow space.*

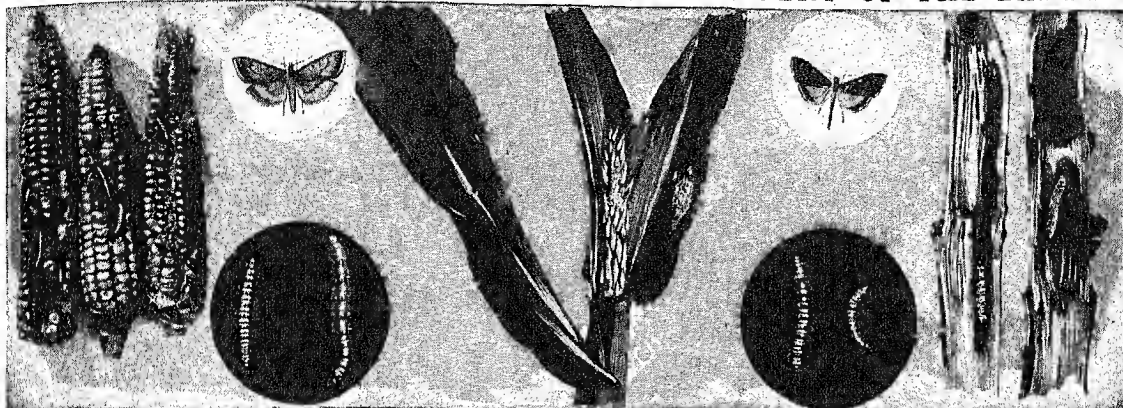
With its head toward the entrance of its tunnel, the chrysalis lies for perhaps four weeks. And what happens then we may let a well-known naturalist tell us. He is looking at the little hole in the bark of the tree, a neatly drilled hole just big enough to take an ordinary lead pencil!

"The sun's rays are falling directly into the hole, partly illuminating its interior, and while we are wondering what function the hole could serve we suddenly become aware of the fact that there is something moving inside it. What can it be? Some inquisitive insect, maybe, that has entered and is now returning."

"Presently the forepart of a shiny brown body appears, gradually advancing by little bunts as if pushed from behind, until at last it is distinctly protruding from the hole. Still it continues to advance, and just when we expect to see the curious object fall on the ground an extraordinary transformation scene takes place."

"The brown skin suddenly breaks open, and from it a wasplike insect with a black-and-yellow banded body crawls onto the bark. Its wings at first look soiled and crumpled, but in a few minutes they unfold from their creases, and the insect at once begins to travel up the branch, continuing

TWO OF OUR INSECT RIVALS FOR THE MASTERY OF THE EARTH



Insects do two billion dollars' worth of damage to United States crops every year. One of the most menacing of these pests is the European Corn Borer, which is supposed to have been brought to America about 1910 in broom corn shipments from southern Europe. Since then it has spread at an enormous rate, until it has become a serious danger to our most important crop. In its adult stage the Corn Borer is a slender moth about three-fourths of an inch long. The upper circles in the picture show a female moth (left) and a male moth (right). The circles below show Borers in the larval stage, during which they work their havoc. At the left you see them feeding on ears of field corn; in the center is a damaged tassel bud; at the right they are tunneling corn stalks.

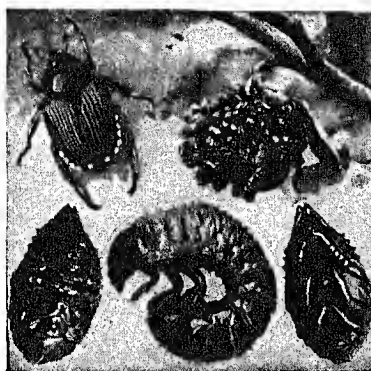
until it reaches the cut end left by the woodman. There the hornet-like creature suns itself for an hour or more, looking decidedly dangerous even as it rests. When the sun is at its brightest the insect's feelers quiver excitedly, and then, with a beelike buzz, it takes to its wings."

Tiny as they are, these three insects—the lacewing fly, the hover-fly, and the hornet-moth—are of vast importance to man. For the hornet-moth is one of the destructive family of clearwings that includes so many of our dreaded "borers," such as the peach borer. But the hover-fly and the lacewing fly belong to the armies of friendly insects that help keep the world habitable for us. Their special prey is the aphids, those devouring plant foes that multiply with such incredible rapidity. In a single summer, Professor Huxley calculated, the descendants of one aphid would produce, if unchecked, a bulk of matter equal in weight to all the living people on the earth.

But the lacewings and hover-flies will take care of this. Life will not fail us. Her myriad hosts will maintain the balance upon which all our lives depend.

INSTALMENT BUYING. Most automobiles are now bought on the instalment plan. The buyer pays down only part of the price and pays the balance in monthly instalments. Real estate, furniture, household appliances, radios, and jewelry are also bought largely on time payments. The total volume of such sales has been variously estimated at from one-twentieth to one-seventh of all the nation's retail business.

Economists see both advantages and disadvantages in this form of consumer credit. Millions of consumers enjoy comforts and luxuries they never could possess



The Japanese Beetle, which was first discovered here in 1916, attacks almost every kind of plant and tree. Above at the right you see a group of beetles fairly enveloping an apple. At the left is an adult beetle. The lower pictures show the pupa and the larva.

if they had to wait until they could pay the price in one sum. Sellers can get mass distribution for expensive articles, instead of having their market limited to the comparatively rich. The automobile business never could have become as big as it is without instalment selling.

On the other hand, extravagant buyers may tie up too much of their income in meeting instalments. If illness or unemployment cuts their income, they may lose both the articles and the money they have paid. To prevent such misfortunes, reputable merchants carefully investigate the financial standing of

buyers, to make sure that they have sufficient income to make such purchases safely.

Moreover, instalment buying increases the cost of goods. Since the seller must get interest on the money owed him and must also maintain a collecting organization, a *carrying charge* is added to the cash price. In many lines of business, special *finance companies* take over the buyer's obligation from the retail seller, and carry the transactions themselves. Most instalment sales are *conditional*; that is, the article remains the property of the seller until all payments have been made. Many states require use of a "uniform conditional sales contract" to prevent unfair terms.

Although records of instalment sales have been found on clay tablets preserved from the days of ancient Babylonia, this form of consumer credit first came into wide use during the 19th century. Furniture dealers adopted it in the early years of the century. It was applied to sewing machines about 1850 and to pianos about 1875. In the present century it has spread to goods and services of almost every kind and is common in practically every modern country. In England instalment buying is called hire purchase. (See also Credit; Thrift.)

INSURANCE. In our daily lives we are surrounded by dangers and risks. The father of a family may die suddenly and leave his widow and children penniless. He may be struck by an automobile and lie for weeks in a hospital. His home or his store may burn down. He may live beyond the time when he can earn an income, and find himself destitute.

Insurance has arisen to provide protection when such misfortunes come. This can be done because, on the average, misfortunes happen to about the same numbers of people and the same amounts of property year after year. Knowing this average rate, groups of people can unite for mutual protection. Each pays an annual sum large enough to make a total that will exceed the total average loss for the group. When any member of the group has a loss, he or his beneficiaries receive a definite sum of money to help make good the loss.

How Insurance Began

The principle of insurance can be traced back to the days of ancient Babylonia. In the Middle Ages it may be seen in the mutual assistance that guild members gave one another (see *Gilds*). But insurance as a business is no older than the 14th century of our era, when Italian merchants began insuring ships. The earliest known life insurance policy was issued in England in 1583, and the first English insurance law was enacted in 1601. About a century later, one of the most famous institutions associated with the history of insurance came into existence. This is Lloyd's of London, which originated about 1690 in the coffeehouse kept by Edward Lloyd. This establishment came to be a resort for business men interested in shipping and foreign trade, some of whom were willing to act as insurers. Ship-owners and others looking for insurance underwriters soon found it easier to go to Lloyd's than to make the rounds of offices. Thus the first great insurance company had its origin in the same way as the clearinghouse (see *Banks and Banking*), out of a mixture of social custom and convenience. To give the society increased powers and greater control over its members, it was incorporated in 1871. It differs from the usual insurance company in one fundamental respect: the corporation as such does not write insurance, but the risks are assumed by the underwriters individually, each of whom is personally liable. The corporation, however, makes audits of each member's accounts and in other ways provides

a constant check to safeguard its members' interests. It takes all forms of insurance except life.

Various Forms of Insurance

The great development of insurance in all its branches coincided roughly with the spread of industrial organization in the second half of the 19th century. Special companies now insure against accidents, ill health, theft and burglary, damage to automobiles or by automobiles, damage by cyclones, hailstorms, earthquakes, airplanes, and losses from bad debts or embezzlement by employees. It is even possible to take out insurance which will compensate one in the event of rain or snow on a specified date. In short, it is now possible to insure against almost any kind of inconvenience, or suffering.

No matter what the kind of insurance, the payment made for the protection is called the "premium." This is figured on the law of averages, which is well illustrated in the case of fire insurance. For many years the insurance experts have kept records of losses by fire, not only as to the number of buildings burned, but as to the relative loss in various types of construction and kinds of business. Obviously, a hardware store in a building with steel beams, brick walls, and a tile roof is a much better risk than a lumber mill built of wood. A wooden dwelling with a shingle roof carries a higher risk than the same house with

a tile or slow-burning composition roof; and a brick house carries a still lower rate. The insurance companies also give lower rates in cities well provided with fire-fighting apparatus than in villages that have only volunteer hose companies.

Fire insurance premiums are always computed on the basis of \$100 of value. If paid up for three years in advance, fire insurance is sold at two and one-half times the annual rate. Most other forms of insurance are sold on the annual basis. Marine and travel insurance policies, however, are usually written only for single trips.

Workmen's Compensation Insurance

In nearly all the states employers are required by law to carry workmen's compensation insurance for the benefit of workmen and their families if the worker should be injured or killed in the course of his employment. Employers must either give proof of their ability to meet compensation risks, or must insure their risks in state funds or private insurance companies. (See *Employers' Liability*.)

HOW TO BUY LIFE INSURANCE

1. Buy your insurance; don't wait to have it sold to you. Shop around. Get the fullest information about any policies you are considering and buy what best suits your needs.
2. Use insurance to protect your dependents in the event of your premature death. Use systematic savings to prepare for your future retirement. But be sure you know what you are doing before you combine these elements in a single insurance contract.
3. Place your insurance primarily on the family breadwinner.
4. Remember that you get more for your money in ordinary insurance than in industrial insurance.
5. Make sure you investigate savings bank life insurance if you have it in your state.
6. If the company you work for offers group insurance, take all that the plan allows you.
7. In arranging your insurance program do not overlook benefits payable under the old-age and survivorship provisions of the Social Security Act.
8. If you have taken a loan on a policy, or need a new loan, investigate the possibility of refinancing or borrowing through a bank.
9. Don't buy more insurance than you can pay for, and after you have purchased it, keep it in force so long as your needs for it exist. Don't buy a policy, pay a few premiums on it, allow it to lapse, and then at some later time buy another policy, or you will be wasting your money.

—From 'How to Buy Life Insurance', by Maxwell S. Stewart. Published by Public Affairs Committee, Inc.

Workmen's compensation is one form of *social insurance*, which is designed to provide funds for people unable to earn. Another form is unemployment insurance, which appeared as early as 1824 when an English labor union set up a fund for members out of work. Similar voluntary systems grew up in Europe. Compulsory unemployment insurance was introduced by Great Britain in 1911. Under this system, which became known as the "dole," contributions were made by the government, the employer, and the employee. Nearly every European country now has a national system, either voluntary or compulsory. In the United States, Wisconsin was the first state (1934) to introduce such insurance, with contributions made by employers only. Aided by the Social Security Act of 1935, all states had, by 1938, established compulsory unemployment insurance on the basis of contributions from employers. (See also Social Insurance.)

War Risk and Defense Insurance

Shortly after entering the first World War in 1917, the United States established a system of War Risk Insurance for men and women in the military and naval services. Later it made Government Life Insurance procurable by those who had served in the armed forces of the United States from 1917 to 1921. The National Service Life Insurance Act of 1940 made insurance available to those enrolled under the Selective Service Act of that year and to those already in service. In each case insurance was granted in amounts of not less than \$1,000 nor more than \$10,000; and no person might carry a combined amount of more than \$10,000.

Life Insurance in the United States

Insurance companies have reached their greatest growth in the United States. The first American life insurance company was organized in 1809, as a stock company. The first mutual company was the Mutual Life Insurance Company of New York, which issued its first policy in 1843. The New England Mutual began business in the same year, and between 1845 and 1847 five other companies began business. This development of life insurance is one of the many social changes which the age of Jackson produced. It was a period when manhood suffrage was spreading, when a new wage-earning class was awakening to its rights, and when individuals were acquiring a new sense of personal opportunities and responsibilities.

In a stock company there are both stockholders and policyholders; the former make an investment and collect a profit if the investment proves good. In a mutual company the policyholders are themselves the stockholders. They own the company and the management is responsible to them. In practice the rates charged by the two classes are about the same, but the mutual companies do more than two-thirds of the total business in the United States.

The commonest form of insurance policy is "ordinary life"; in return for the payment of a fixed annual premium (payable quarterly or semi-annually if desired), the company agrees to pay a fixed capital sum at the death of the insured. By special arrange-

ment this payment may be spread over a period of years, sometimes for the life of the beneficiary, or it may be paid to the surviving heirs of the beneficiary in case the beneficiary dies soon after the insured.

Term Insurance

Life insurance for a limited time, usually seven or ten years, is called "term insurance." During this term the insured pays only a portion of the ordinary premium, the balance being allowed to accrue until the end of the term. If he dies before the end of the term his beneficiary receives the full amount of insurance. If he lives he may allow the policy to lapse, in which case he receives no further benefit or protection, or he may convert it into some other form of policy; this he does by paying the accumulated difference between the term premiums and the regular premiums, and receives as offset the accumulated dividends to which he would have been entitled if he had been paying the full premiums.

Term insurance is often sold on the "group plan," by which an employer insures the lives of all his employees, regardless of their ages and physical condition, at a blanket rate. The premiums may be paid by the employer or by the employees, or both may share the expense. The first group insurance was issued in 1911. Similar arrangements often are made to provide group accident and health insurance for employees, and annuity insurance of this sort also is available.

Term insurance has no "cash surrender value"; if the insured allows his policy to lapse, he receives no return on his money paid in, whereas on an ordinary life policy he is entitled to a refund of part of his money, usually beginning with the third year. All states now require the company to write in the policy the cash surrender value for each \$1,000 insurance in force. Except on term policies, the insurance company will also make loans to its policyholders in proportion to the amount of premiums paid in; these loan values are specified in the policy.

Endowment Policies and Annuities

"Endowment" policies are a special form in which the insurance is payable to the insured person at the end of a selected period (often 20 or 30 years), or to the beneficiary if the insured person should die earlier. Premiums may be paid during the whole period or during a shorter term of years if desired.

An "educational" policy is usually purchased on the endowment plan. This provides a sum of money to be paid in cash at the beginning of each school year to the child who is named as the beneficiary.

Various kinds of "annuities" are also sold by insurance companies, though these are not strictly insurance. In one popular type of contract, the company guarantees the investor or others a fixed income, in return for the deposit of a certain sum of money paid either in a lump or in annual instalments.

Life insurance premiums are all based on the "life expectancy" of the person insured. Thus, while no one can say when one person 30 years old will die, it is known that on the average, American men of that

age will live to be about 68 years old, or 38 years more. Rates are fixed accordingly. Life expectancies vary according to age, sex, place of residence, occupation, and other factors.

Huge Financial Institutions

Life insurance has created some of the largest private financial institutions in the world. In many years the total income of the insurance companies of the United States has exceeded the income of the Federal government itself. This income consists not only of premiums but also of profit from investments. When profits from investments shrink, premium rates have to be raised.

Investments are made under the supervision of the state in which the company is chartered, and sometimes also of the states in which it does business. All states permit life insurance companies to invest in bonds issued by the United States government or by other governmental units, and in loans on real estate. Most states permit them to invest in bonds issued by railroads, electric light and power companies, and industrial companies. Some states allow investment in stocks as well.

Life insurance companies own a substantial proportion of government bonds, utility and industrial bonds, railroad securities and urban and farm mortgages. Since many mortgages have to be taken over, insurance companies own and manage various types of property. They own a considerable proportion of all farm property. Some companies have built huge housing projects in large cities.

Since the assets of life insurance companies in the United States total many billions of dollars and nearly all their funds are invested, these companies are powerful agencies of industrial investment. They are also an important source of the credit needed to finance the nation's enterprises. To the millions of policyholders, life insurance represents a considerable part of their savings. It is also their chief reliance for credit when they need to borrow to meet emergencies.

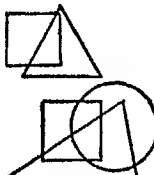

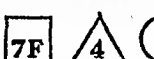
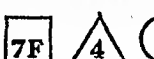
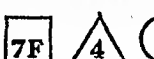
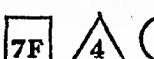
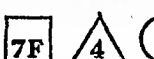
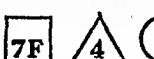
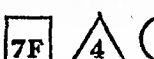
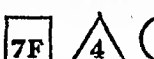
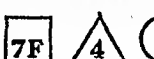
How Insurance Is Sold

Most insurance is sold by salesmen and saleswomen who call on prospective purchasers. Agents are high-school or college graduates; they usually receive special training from their companies.

In a few states life insurance is also sold by savings banks. Since there are no commissions on sales, the rate is cheaper; but the amount of insurance one can buy is limited. Massachusetts adopted this plan as early as 1907. It was not until 1939 that New York became the second state to enact similar legislation. Connecticut followed in 1941.

INTELLIGENCE TESTS. Early in the present century, two French psychologists, Théophile Simon and Alfred Binet, were commissioned to find out why certain children in the schools of Paris lagged behind their classmates in school work. These men discovered that by obtaining the average performance of children of various ages on different tasks, they could measure mental ability. Such tasks as pointing to the nose, eyes, and mouth; repeating two numbers after they had been pronounced by the examiner; telling what objects are seen in certain pictures; giving the family name; and repeating a sentence of six syllables, were found to lie within the mental ability of average three-year-old children. If a three-year-old child can do these, he is said to have a mental age of three years, since he can do what the average three-year-old can do. But if a five-year-old can only do these and not those for the four-year-old or five-year-old, he is said to have a mental age of three

HERE'S A TEST FOR QUICKNESS AND ACCURACY

1. ○ ○ ○ ○ ○
2. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
3. 
4. 
5. ○ ○ ○ Yes No
6. ○ ○ ○ MILITARY GUN CAMP
7. 34-79-56-87-68-25-82-47-27-31-64-93-71-41-52-99
8.  7F  4  3  5A  8  2  6  9B  3

The instructions for each part of the test and time in which they must be carried out are as follows: 1. Make a cross in the first circle and a figure 1 in the last circle—five seconds. 2. Draw a line from circle 2 to circle 5 that will pass below circle 3 and above circle 4—five seconds. 3. Make a figure 2 in the space which is in the triangle but not in the square, and make a figure 3 in the space which is in the square and in the triangle—ten seconds. 4. Make a figure 2 in the space which is in the triangle but not in the circle or square, and make a figure 3 in the space which is in the square and circle but not in the triangle—ten seconds. 5. If a captain is superior to a corporal, put a cross in the second circle; if not draw a line under the word "No"—ten seconds. 6. Make in the first circle the third letter of the first word, in the second circle the first letter of the second word, and in the third circle the first letter of the third word—ten seconds. 7. Cross out each number that is more than 60 but less than 70—15 seconds. 8. Draw a line through every even number that is not in a square, and also through every odd number that is in a square with a letter—25 seconds.

years. Similar but more difficult tasks were used for older children. Tests were selected which would measure native ability rather than home or school training; hence they covered a wide range of tasks that are common to the environment of all children.

Later two American psychologists, Dr. Lewis M. Terman and Dr. Fred Kuhlmann, each adapted these methods of measuring intelligence to American conditions, and these revised tests have been given to many thousands of children. The Terman adapta-

tion is called the Stanford Revision. Recently series of tests have been devised for measuring the mental ability of children from the age of one and one-half years to five and one-half years. These tests can be administered successfully only by a trained investigator to one child at a time.

It was the first World War that gave the greatest impetus to the development of intelligence tests in the United States. Millions of men were being called to military service. It was necessary to discover immediately how each of these men could best serve his country.

The Army Test was developed and ultimately given to 1,727,000 American soldiers. Its purpose was to rate natural mental ability—the ability to learn, think quickly and accurately, analyze situations, and comprehend and follow instructions. The results were evaluated according to terms of military needs and men with a certain average of intelligence were selected for occupational assignment in accordance with their rating.

This test revealed some startling facts. For example, 45,000 of the men made no higher scores than the average ten-year-old boy should make.

About 10,000 men were found mentally unfit for any military service. The saving to the nation through being spared the expense of training and transporting these men was at least \$25,000,000. More important, it was possible to select the men best qualified to make officers, aviators, gunners, etc., and thus to place individuals to the best advantage. From this time on, intelligence tests were firmly established as a dependable method of determining mental ability.

After the war, psychologists developed similar tests for use in schools. Hitherto it had not been practicable to give mental examinations to school children generally because of the difficulty and expense entailed by individual examinations. Now such tests as the Terman Group Test, the National Intelligence Tests, the Otis Self-Administering Test, and the Kuhlmann-Anderson Group Test of intelligence are used every year in schools to measure the mental ability of hundreds of thousands of pupils.

The Intelligence Quotient

Psychologists have found that the mental ability of a child generally develops at a constant rate as the child develops physically; that is, there is a definite ratio between mental age and chronological age, or age in actual years. This ratio is called the I. Q. or *intelligence quotient*. It is obtained by dividing the mental age (determined by means of various intelligence tests) by the age in years of the person

tested, and multiplying the results by 100. For example, if a child has an actual age of 8 years and a mental age of 10, his I. Q. will be 125 ($10 \div 8 = 1.25 \times 100 = 125$). At the chronological age of 10 this same child would probably have a mental age of a 12½

year-old, for his I. Q. of 125 would remain constant. The I. Q. of an individual, therefore, implies that if Mary is exceptionally brilliant in her early years at school, she very probably will be equally outstanding in the later years. On the other hand, little John, who has great difficulty in solving the simplest problems of the lower grades and is always at the foot of his class, will probably lag behind his classmates as long as he remains in school. Feeble-minded persons committed to institutions seldom have intelligence quotients over 70. An I. Q. of 140 or more usually indicates high mental ability.

There are also tests for measuring specific aptitudes. The Seashore Tests for musical talent are examples of this type. One of these tests measures the ability to notice small differences in pitch, another measures the ability to notice small differences in loudness of tones, a third measures ability to notice small differences in time. Children who make high scores on the entire series tend to profit from musical instruction far more than those who make low scores on all or a part of the tests.

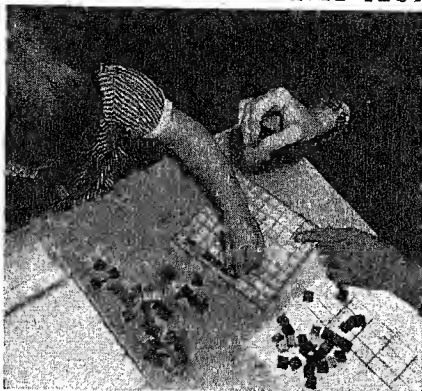
Achievement Tests

Tests for measuring school attainment have been developed during recent years. These are known as *achievement tests* and are used for rating the progress of pupils in school subjects. By comparing a pupil's attainments with the norm, or average, for his mental age, a teacher can quickly see whether the pupil is doing as well in a particular subject as most children of his mental ability.

There is a growing practise of grouping school children into classes on the basis of mental ability and school attainment rather than on the basis of chronological age. Classes for backward and sub-normal children have long been provided in the public schools. Classes for gifted children are now being more and more widely organized, with instruction adapted to the superior mental ability of these children. (See Individual Differences.)

Psychologists are now devising tests that will measure specific abilities more accurately, and are working to reduce their results to common units of measurement. The existing scales and methods are still far from perfect, but each year striking improvements lead to greater and greater precision in mental measurements.

TAKING A PERFORMANCE TEST



To determine the child's ability to cooperate efficiently, the teacher and child start filling the squares with colored tiles. Will the child follow an agreed pattern of colors? Will it properly match the half-tiles (oblongs and triangles) in filling a square? These are the objects of the test.

The Art of CREATING Delightful HOME INTERIORS

INTERIOR DECORATION. A great artist once said that the spirit of beauty and true art often deserts the gaudy gilded palace and comes to rest upon a simple Japanese tea-cup. It may likewise come to rest in a simple cottage whose rooms are true in proportion, gentle in color, restful in feeling. It is the purpose of interior decoration to bring beauty and livableness to a room.

Naturally, furniture making and room decoration are closely allied to architecture. A chest, or a desk, has

a sort of façade, like a building, and its lines and details have their origin in architectural forms. Since Rome fell, in the 5th century, there have been but two great styles of architecture, Gothic and Renaissance. These have subdivided into lesser styles, as they were refined by more civilized life, colored by the various national temperaments, adapted by different artists and by changing thought. (See Architecture.)

Old styles come back into new fashion, and are seen in a new way. Old Spanish furniture in a modern setting seems like a new thing in itself. Antique examples, or expert modern copies, of Colonial, Louis XVI, Sheraton, or Hepplewhite, may give just the effect we want in a new home. Or the modernist art, breaking completely with the past just as the Renaissance artists broke with Gothic styles, may please with its simplicity and its mood of the new age. To understand either the period vogue or the modernist, it is essential



When the severity of Gothic yielded to the grace of the Renaissance, this beautiful room of the Soranzo Palace, Venice (now in the Pennsylvania Museum), was built. The pointed Gothic window has Renaissance carvings. Beside the huge fireplace sits a Savonarola, or Dante, chair. Red and gold fabric is hung in the carved wooden "screen" which shuts the four-poster bed from the rest of the room.

to know the outstanding characteristics of interior decoration in the past.

Chests Gave Rise to Furniture

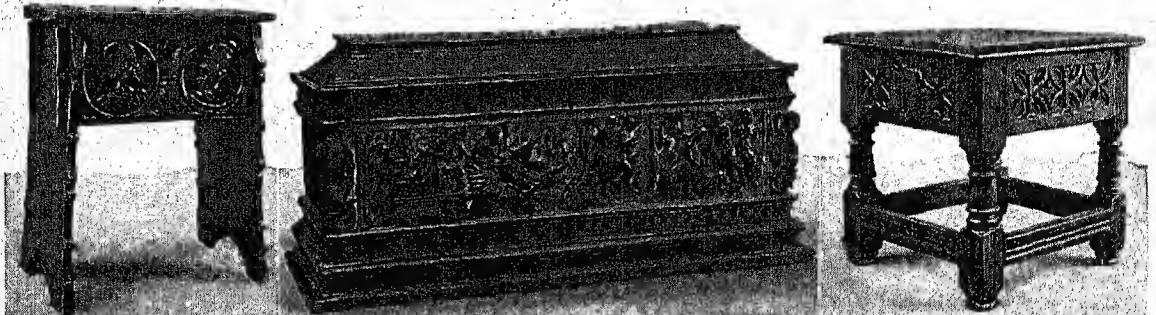
The re-beginning of furniture in the early Middle Ages came with the chest, from which all other pieces of furniture developed. In those days no one was safe; raids and wars destroyed the serenity of life. At a moment's notice people had to be ready to cram their clothes, bedding, dishes, and valuables into boxes, load them upon pack animals, and travel to some new abode. Then

out of the chests would come colored cloths to hang on the walls. Silver or earthen dishes would be ranged on one chest, which became a table. Cushions piled on another would make it a seat or a bed.

Even when life became safer, people were slow to develop new pieces of furniture, but kept on decorating walls and doorways with movable hangings; their tables were huge planks laid across trestles, so that they could be taken apart and moved out of the way when not needed. Not until the 17th century did women make much use of chairs; usually they sat on cushions on the floor. Chairs were only for the master of the house and distinguished guests.

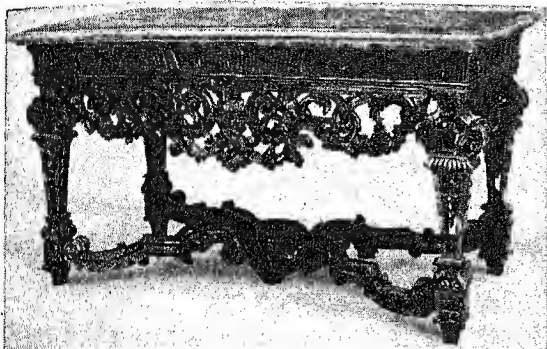
As Gothic furniture gradually developed in the various European countries, it followed the lines and motives of Gothic architecture. The outline of each piece of furniture was rectangular, but on it would appear pointed arches and panels containing human

CHESTS AND STOOLS FURNISHED A HOUSE IN THE OLD DAYS



In Tudor times in England, toward the first half of the 16th century, a guest was lucky to get even so crude a stool as the one at the left. Of course, some Tudor furniture was more finished and elaborate. The Italian cassone (big chest) with its carved story of Demeter and Hecate searching for Persephone is typical of the huge carryalls with which modern furniture began. The box-top oaken stool of the Jacobean period shows how, even after the Elizabethan era, our ancestors sat most uncomfortably.

THE OVERORNAMENTED STYLE OF THE LOUISES



Although of the date of Louis XIV, the fulsome curves of this table approach the scrolled effect of the Louis XV style.



A Queen Anne chair with Dutch details of carved splat, cabriole legs, and club feet.

figures, grotesque imaginary animals, or carved scenes. A Gothic cathedral was one vast story-book for the unlettered people of those early days, and a Gothic chest or chair is, in proportion to its size, as eloquent, human, and vivid.

15th Century Refinements

By the 15th century, life was calmer and the people more civilized. The *credence*, or buffet, and the *dressoir* (sideboard), with shelves for cloth and plate, were common. Instead of the early architectural designs, there came in a vogue for linen-fold carving, which represented on the front panels of a chest or cupboard the elegant folds of a piece

western Europe. In France, the dawn of the Renaissance is called the style of Louis XII. Instead of details derived from Gothic architecture, the architectural columns of ancient Greece appeared in furniture as well as in architecture. Chairs and chests and tables were carved with floral designs. The true Renaissance style in France, however, begins with François (Francis) I. This passed gradually into the style of Henri (Henry) II. Of the Renaissance styles in general, P. Rouaix, a French authority on furniture, has said:

The characteristic impression is that of vast wealth of varied fancy in the decorative motives and in the swarm of their details.

Every piece of furniture is a whole world in which

swarm real or fantastic beings mingled with garlands of flowers and fruits. It is the spectacle of fat fecundity, better nourished than the style of the preceding period. Gothic carving was all on the same plane; its richness was more geometrical. In the Renaissance style the planes are innumerable.

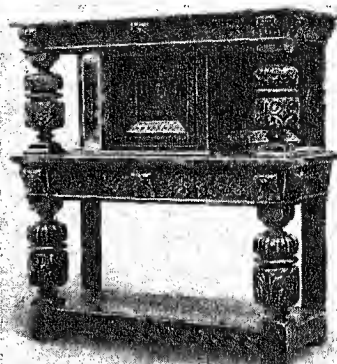
Greek Influence in the Renaissance

The larger pieces of furniture had an almost monumental façade, displaying the three orders of Greek architecture, Doric, Ionic, and Corinthian, one above the other. At the top there might be a bust or statuette; in niches, figures of antique heroes or divinities. From the center of round medallions protruded curious heads with outstretched necks. Garlands of flowers, figures which end in a pillar, water gods who trail off in a swirl of seaweed, initial letters cut out and tied

with strings of foliage, formed part of the detail. The initial F for François, and the salamander which was his sign or attribute, are found carved on many a bed and fireplace and chair of the days of François I.

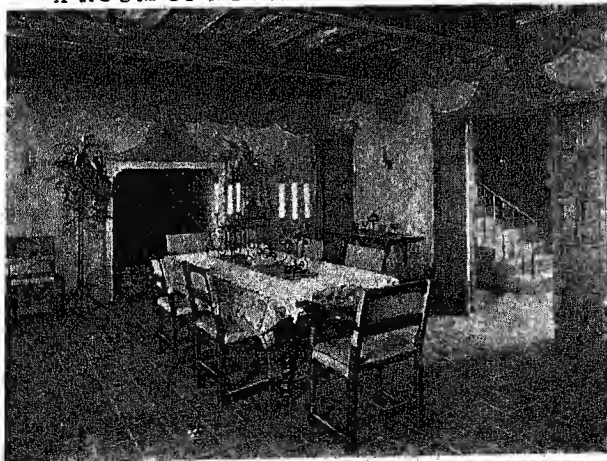
There is something breath-taking and overdone in the François I style, from which the style of Henri II is a relief. It is more severe and geometrical, the ornament more restrained; the general shape of pieces of furni-

ENGLISH COURT CUPBOARD



Of sturdy oak, with bulbous details, this massive cupboard is typical of the late 16th century in England, in the late years of Queen Elizabeth's reign.

A ROOM OF AUSTERE SPANISH CHARM



Tile floor, rough plaster walls of interesting stencil, make the strong background for this severe Spanish furniture.

of beautifully draped linen.

The northern countries retained the natural color of the woods they used, but in Italy, closer to the bright hues of the Orient, a taste developed for brilliant colors in furniture, accomplished by painting or by marquetry (inlaying woods and stones).

The Renaissance, which uprooted the old ways of thought in all departments of life, deeply affected furniture and the decoration of the home (see Renaissance).

The beginnings of gaiety, comfort, elegance, and gentleness appeared first in Italy, then everywhere in

ture again tends to be rectangular, and finely fluted columns take the place of human figures acting as supports.

A similar feeling of richness and grandeur pervades the furniture under Charles IX and Henri III. Under Henri IV the designs grow heavy, overcharged with detail, but are finely executed.

It will be noted that the great furniture styles are chiefly associated with the name of a monarch, and that with the end of monarchy as the prevailing form of government, national styles ceased. In royal times, the court and court artists set the style, and the

rich nobles, who alone had any furniture worth mentioning, followed this style closely.

In Germany the Renaissance did little to enliven the heavy seriousness of medieval furniture.

A French expert, Edmond Bonnaffé, says:

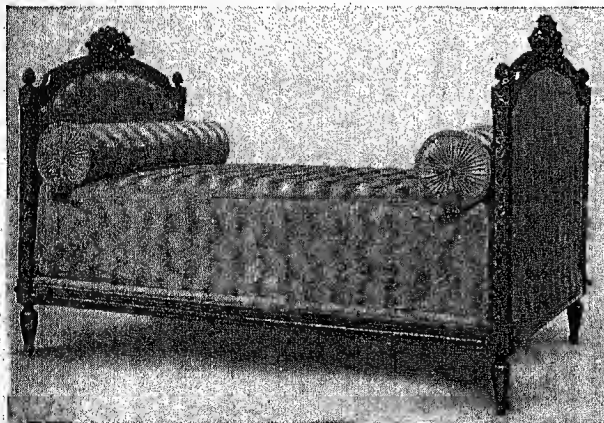
The German was an impenitent Gothic who was never touched with the grace of the Renaissance. He accepted it unwillingly, coarsened it, dislocated it, made its profiles heavy and its proportions unnatural and excessive. The features of German workmanship are apparent at first sight, the rigid figures, intentional ugliness, a wealth of complicated ornaments executed with marvelous skill. . . .

There is no taste, but an inexhaustible animation; no grace and abandon, but . . . extreme striving for effect, character and expression; and undeniable power.

Elizabethan and Jacobean Styles

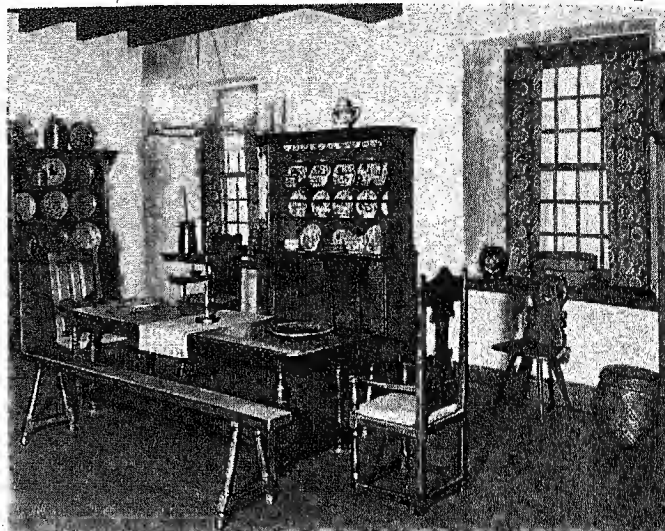
Little good furniture was produced in England before the Renaissance, although there were some fine

RESTRAINED ELEGANCE OF LOUIS XVI



The return of the Louis XVI style to simple, classic lines is a relief to the eye in this bed, covered with silk moiré.

THE CHEERFUL VIGOR OF DUTCH COLONIAL

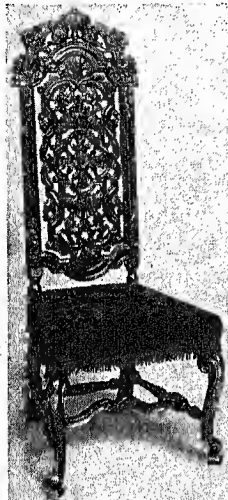


When New York was New Amsterdam, the Dutch colonists tried, by importing furniture or by copying it, to reproduce the charm of their homeland. In this old Millbach room in the Pennsylvania Museum, Philadelphia, we see the Dutch taste for oriental designs in curtains and pottery.

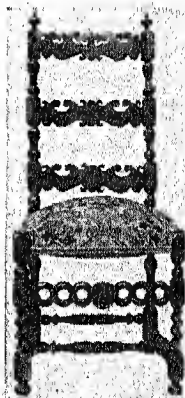
pieces of the Tudor style under Henry VIII, notable chiefly for their handsome carving. The Renaissance touched England under Elizabeth, hence the style is called Elizabethan. Although furniture became smaller and more useful and livable, the carving was not so delicate as that of the same date in France and Italy. The eustomary Renaissance details were present; but often, on the same piece of furniture would appear the old linen-fold carving or the Gothic tracery. Dutch furniture greatly influenced the taste of these days; the Elizabethan style is also sometimes called a Germanized Italian, or an Anglicized Flemish.

There is no sharp difference

between the late Elizabethan and the early Jacobean. As the Jacobean style progressed, it became less original and more formal. Designs grew flatter, and floral ornament stiffer. Ornaments were cut out separately and applied, rather than cut out of the solid. An oval half-lozenge, sometimes inelegantly compared to half a boiled egg, was applied in geometrical patterns, as was the spindle ornament, cut in half. Turned supports and uprights took the place of carved figures, often with a swelling bulb in the center of the support; and geometrical designs appeared within paneled surfaces. Contact with the East, particularly with Japan and China, resulted in a liking for lacquered furniture and Chinese designs in painted and embroidered decorations and on furniture.



A walnut chair of William and Mary style.



A Flemish chair of the 17th century, with Rococo details.

As France entered the 17th century, the heavily carved furniture of Henri IV gave way to greater simplicity under Louis XIII (Louis-Treize). There was a great vogue for covering up wood with cloth. Beds were so thickly curtained that they formed a cloth cube; the table cover not only reached the floor but often lay on the floor; the chairs were frequently covered with velvet and trimmed with fringe. Twisted columns, spiral legs, heavy mirror frames, grew in popularity. Rouaix says of this period:

The characteristic impression is one of heaviness and weariness. Dark tones prevail and the marquetry of this period, consisting of metal, wood, and tortoise-shell, is somewhat severe and cold. The ornament comprises round, inflated cartouches, massive balusters, twisted columns, heavy garlands of large fruits, apples and pears, with few leaves.

Louis XIV (Louis-Quatorze), the "Sun King," the absolute monarch who said "L'état, c'est moi" (I am

THIS DELIGHTS A GOOD BREAD MAKER



While the French kings were decorating their palaces with gilded elegance, simplicity marked French provincial furniture. Above the old *petrin*, or kneading trough, hangs a decorative bread-box and other kitchenware.



The table-top which tipped as shown to make a chair back was also used on American settles.

the state), believed in the large gesture and the grand manner. Versailles, the palace on which he spent a fortune, crammed as it is with furniture of the three Louises and a good bit of Empire style, appeals to the modern taste as slightly "Hollywood." The individual pieces in these rooms, however, are for the most part very fine, and it is the style of Louis XIV on which

the world has since depended when it wished to be very grand.

The Louis XIV is classed as "Formal Rococo." The Rococo style began under Henry IV, grew in popularity under Louis XIII and in its later stages amounted almost to a public nuisance. The word comes from the two French words *rocaille et coquille* (rock and shell). The curves of rock and shells, worked out in schemes of adornment, became infinitely wearisome. However, the curve in the Louis XIV style was relieved by many straight lines, and the effect

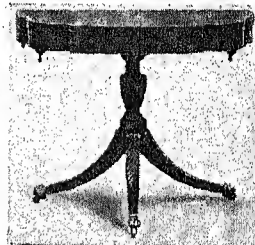
was one of dignity and grandeur. The classic acanthus, the ram's head, the mask and satyr, appeared in carving on the massive furniture, which at first carried over the Louis XIII style. Toward the end of Louis XIV's long reign, marquetry and ormolu (gilded bronze) largely replaced carving. Though the ornamentation was classic, it derived from Rome rather than from Greece. Plumed helmets, shields, the lictor's fasces, laurel wreaths, Victories blowing trumpets, river-gods leaning on urns, and massive horns of plenty were popular; and on big round or oval cartouches appeared the royal coat of arms, the fleur-de-lis, or the double L, the king's cipher. The anthemion, or honeysuckle pattern, was a great favorite.

The silver furniture brought to the French court by Anne of Austria had stimulated a taste for carved gilded pieces, particularly for great gold mirror-frames. Glittering chandeliers grew bigger and brighter. One of the few items which grew smaller under the grand Louises were fire-

places, which had to be cut down to appear well with the paneled walls, painted and gilded, and with the bright tapestries in gay tones and frivolous adaptations of classic patterns. Colored marbles of bright hues were imported for mantels and for tops of commodores and tables.

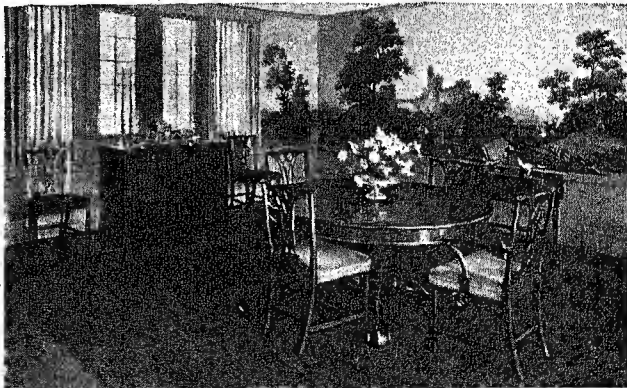
"Bouille" Ornaments

One of the most famous cabinetmakers of the period was André Charles Bouille, who made the inlays and combinations of brass, wood, and shell associated with his name. He would cut a



A tilt-top mahogany card table showing the work of Duncan Phyfe of New York.

LANDSCAPE PAPER BRIGHTENS A SIMPLE ROOM



The freshness of the out-of-doors is brought to the dining-room by the use of agreeable landscape paper. Plain curtains and rug, and the simplest type of Chippendale chairs and Hepplewhite buffet give full value to the wall paper and are fine in themselves.

design out of brass, using shell as a background. He would then utilize the pieces left from the cutting and make a reverse design with the shell as the pattern and brass as background. These twin works are known as *boulle* and *counter*, or first and second *boulle*.

The Louis XV (Louis-Quinze) style is of two periods, the Regency style, during the years when the small king was a minor, and the Louis Quinze proper.

With the death of Louis XIV the old pomp and magnificence died, and the court of the regency desired lightness and gaiety. The scroll curling and twining everywhere, the shell scroll, the curled endive, and the spiral scroll flourished unchecked. With rich ornament and flawless workmanship the artist strove to make up for what was lost in balance and symmetry.

Extreme Ornamentation Under Louis XV

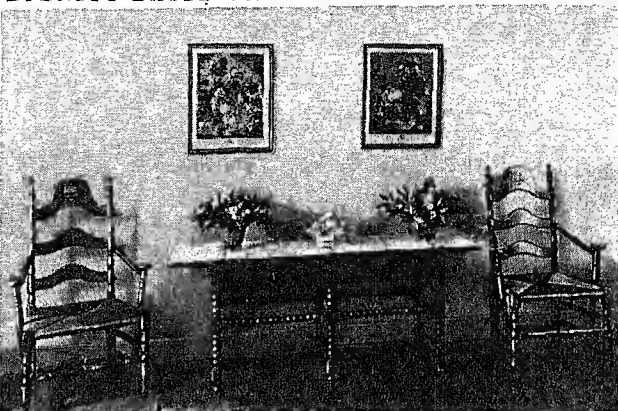
When Louis XV was ordering luxuriously decorated rooms for Madame de Pompadour, the *verniss Martin*, a lacquer produced in an effort to imitate Chinese lacquer, had a great vogue. The light hues of the painted furniture, the glitter of crystal and silver and gold, the painted cupids and simpering rustic maidens, called for even lighter and airier colors, reflected endlessly in too many mirrors, too large and too begilded.

THE CHIPPENDALE STYLE



Chippendale's best manner, with perhaps a touch of his florid mood in the chair back, mellowed the "Powell Room" of the Pennsylvania Museum.

DIGNITY BASED ON BALANCE AND SYMMETRY



Formality is achieved in this dining-room by the perfect balance in size and placing of the pictures, flowers, and chairs. The table shows a strong Jacobean influence; the slat-back chairs are American Colonial, successfully combining two periods. Such an arrangement calls for subdued walls, lightened as here by color in the pictures and flowers.

Louis XVI (Louis-Seize) reverted to simple, straight lines. Classic details, the fluted column, the bay leaf, the bellflower or "corn husk" pattern, the oak and acorn, the Greek key, superseded the wearisome Rococo. Ornament was once more properly subordinated to proportions, to use, and to good taste. To be sure, light delicate colors were

retained and the mode was elegant; but there was none of the strength of the Renaissance or the plainness and severity of classicism.

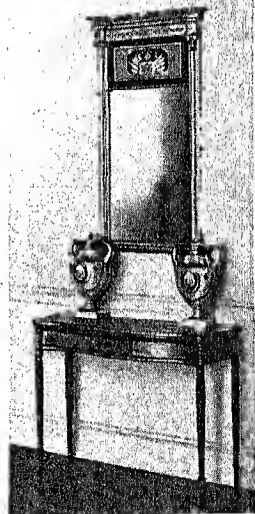
Chairs Become Common

While these elaborate styles were maturing in France, England disregarded the fineries of the continent and developed the simpler and sturdier Queen Anne and William and Mary styles. It is interesting to note that the Commonwealth, with its political notions of

democracy, had increased the use of chairs, which were no longer made only for the master of the house. With the guests and the ladies of the house seated at least as comfortably as the master, the Commonwealth thus advanced the cause of good manners. The chairs of the Queen Anne period are high backed, like those of the Jacobean, and show a strong Dutch influence which King William had introduced. "Cabriole" legs were used on most of the chairs and other pieces. Cabriole is derived from the Italian word *capriola*, a young goat, whose capering legs suggested the curved leg for furniture.

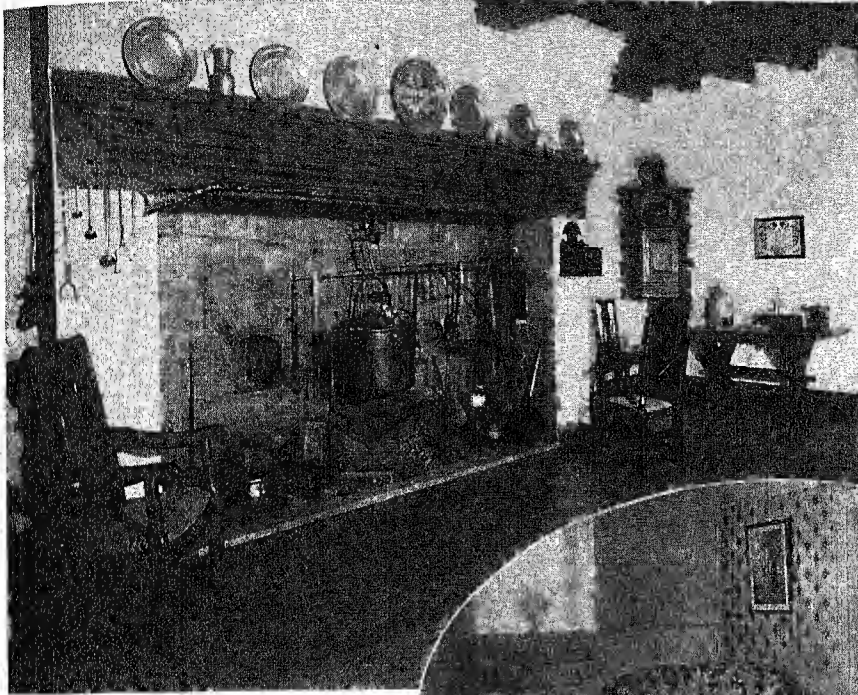
The Dutch, who had many trade contacts with the Far East, had been strongly attracted to Chinese furniture, and they did skilful marquetry. As a result of Dutch influence many a Queen Anne piece shows inlays or painted scenes in an imitated Chinese vein, of simple well-proportioned lines. The chief difference between the styles of William and Mary, and Queen Anne, is greater elaboration in the Queen Anne style, though both were of a refreshing simplicity in comparison to other styles.

The claw and ball foot, much used in Queen Anne furniture of all kinds, came indirectly from China, where the Chinese used it to represent the pearl of truth in the claw of the dragon of wisdom. The shell used so effectively in knee-hole desks, the wing style



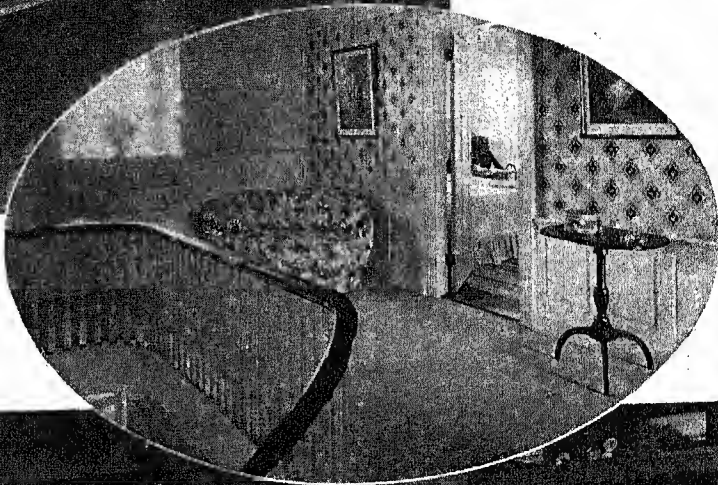
Slim lines and elegant restraint mark these Sheraton pieces in the Pennsylvania Museum "Derby Room."

THE STRENGTH AND BEAUTY OF "THE GOOD OLD DAYS"

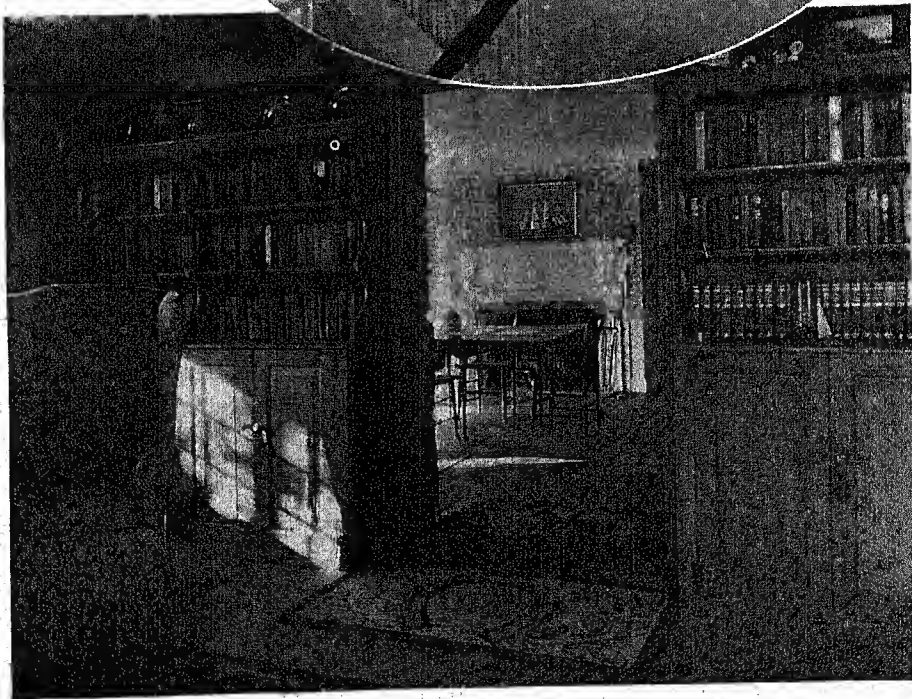


When all the cooking for a large family had to be done in the fireplace, and all the heat for the house came from this same log-burner, it is small wonder that the kitchen was the heart of the house. In this Millbach room in the Pennsylvania Museum we can almost see the Dutch housewife of Colonial days bending over the bean pot and the soup kettle, or proudly reaching for a polished pewter plate. Only strong arms could swing those iron skillets and lift those massive chairs. Such furniture, we feel today, is at its best in museums. The Colonial furniture which adds charm to the modern home is of the type shown in the other rooms on the page.

The white paint, the fine curve of the banister and the quaintly patterned wall paper furnish the right sort of dainty and naively pretty background for the chintz love seat and the Duncan Phyfe table. Tinted steel engravings on the walls also help to bring back the feeling of the America of long ago.



The type of Colonial furniture popular for modern homes, both because of its comfort and simplicity and because of its embodiment of American history, is shown in the lower picture. There is the wing chair, at once dignified and home-like, which was designed in Queen Anne's day and improved by Chippendale. The gateleg table is another favorite, with ladder-back chairs, cane-seated and prim. The ship picture hanging over the fireplace recalls the days of the clippers, and the hooked rugs tell a tale of industry and economy. Low ceilings and wide-planked floors are in keeping with this charming old-style furniture.



of head rest on armchairs, as well as the claw and ball, are Queen Anne details that were so liberally borrowed by Chippendale that often they are credited to him. Pleasantly, but not too profusely, curved lines in the splats of chair backs replaced the straighter Jacobean lines. Increased attention to comfort, greater usefulness, smaller size, and more simplicity in effect are traits of the furniture made in Queen Anne's day.

England's "Golden Age" of Furniture

The 18th century, however, was the golden age of English furniture making. The name of Thomas

which revolutionized the taste of their day. They originated no style, but their interpretation of the classic was far superior to playful French trifling in the same field. Simplicity, elegant slenderness, and low relief were their fine points. They liked open spaces and plain straight lines. Their niches, lunettes, and festoons never cloy; the little paintings worked in as detail for them by Angelica Kauffmann and others, never weary. They used the same details as employed in the Louis XVI style, but with far greater purity and gentility of effect.

George Hepplewhite was another genius of simplicity and elegance, although how much of his work was his own and how much was designed by the relatively unknown Thomas Shearer, no one can say. Certainly Thomas Sheraton founded his style to a great extent on Shearer's ideas, and so, probably, did Hepplewhite.

Hepplewhite and Sheraton

To the Hepplewhite style belong the square slim tapering leg on tables, the shield-shaped chair back, the serpentine curve, and a certain type of inlay. The urn was a favorite decoration, and tambour shutters close many of his desks. Elegance and utility were his objectives. In fact, it is the thorough usefulness and livability of his work, like that of the best work of Chippendale, the Adam brothers, and Sheraton, combined with their small size and light weight, that have given them their present popularity. They fit into small apart-

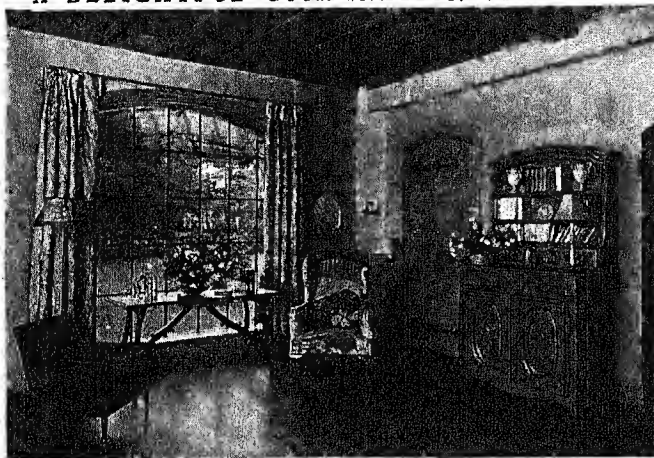
ments, are not too grand for every-day life, and are simple enough to combine with other types of furniture and with many decorative schemes.

Sheraton's furniture follows two distinct themes, that of Louis XVI and that of the Empire (described below). Of him as of Chippendale it may be said that when he was good he was very, very good, and when he was bad he was horrid. The efforts of his last days, travesties of the Empire mode, are indeed horrid. They scarcely seem to come from the same mind which produced his exquisite classic, or Louis XVI, style, those drawing-room pieces of white and gold, of rosewood and satinwood, with inserted plaques of delicate Wedgwood ware. His sofas and chairs were upholstered in silks and satins with oval medallions. Beading, thin lines of inlay, brass ornaments in handles, claw feet and rails, reeded chair legs, and satinwood veneer, are favorite Sheraton details.

With all these 18th century English styles, the colors used in rugs and draperies and other features of the room were held to delicate soft tones, just as in France. White, cream, or pale-colored walls, often paneled, set off the dainty furniture. The Adam brothers even designed the whole house—color scheme, architecture, wall decorations and moldings, carpets, and furniture—so that it was a perfect unit.

This elegant type of decoration was for an aristocratic world. With the outbreak of the French Rev-

A DELIGHTFUL COMBINATION OF STYLES



The ancient and the modern, the Chippendale chair and the Spanish table, reside in perfect harmony in this spacious room because good taste has gone into the combination and its setting.

Chippendale heads the list of the great designers, partly because he was the first English artist to give his name to a style. Chippendale was an adapter of Dutch, French, and Chinese designs, rather than an originator. He is also deeply indebted to Grinling Gibbons, the great wood-carver of Queen Anne's day.

His style owes a part of its success to the fact that the use of mahogany was just coming in, a wood adapted to the creation of elegant furniture. Chippendale's book of sketches, 'The Gentleman and Cabinet Maker's Director', shows designs of three types, adaptations of Louis XV, Gothic, and Chinese. He reveled in elaborate carving, admired the Rococo, and was happiest when making a creation of ribbony ripples to serve as a chair back. His most elaborate pieces did not reach America, and the colonies knew him almost entirely for work which he did under restrictions as to cost, and which he himself did not much admire. Hence the name of Chippendale is in America regarded as synonymous with beauty, whereas he produced many a horror of elaborateness, in spite of the many fine simple things which bear his name.

Chippendale did some of his finest work in executing commissions from the Adam brothers, whose taste was far superior to his own. Robert and James Adam were architects, and their architectural studies gave them a sense of proportion and unity of the whole

olution, and the incoming of Napoleon, the current of ideas changed, and so, naturally, did styles. Out went marquetry, bouille, ribbonary carving, rosettes of gilded bronze, pompadour silks, and meaningless scrolls. But the Empire style, which grew out of the inflated ideas of Napoleon, also had many defects.

Grandiose Napoleonic Influences

In its simplest form, with its rectangular lines and touches of classic adornment, the Empire style is pleasing, though somewhat heavy for modern use. In its most extreme form it is appalling. Once more the changes are rung upon Roman and Greek themes, this time with emphasis on the torch, the victor's wreath of laurel, the Athenian bees into which Napoleon transformed the fleur-de-lis, the anthemion, and the letter N (for Napoleon) of Napoleon's egotism. The griffin, the swan, and the sphinx appeared as chair arms and table legs. There is a fine broad sweep to the huge scroll or eurve used in the best of Empire furniture, particularly in beds and sofas. Applied decorations of bronze and gold form agreeable patterns on buffets, though they catch and tear women's dresses when they appear on chairs.

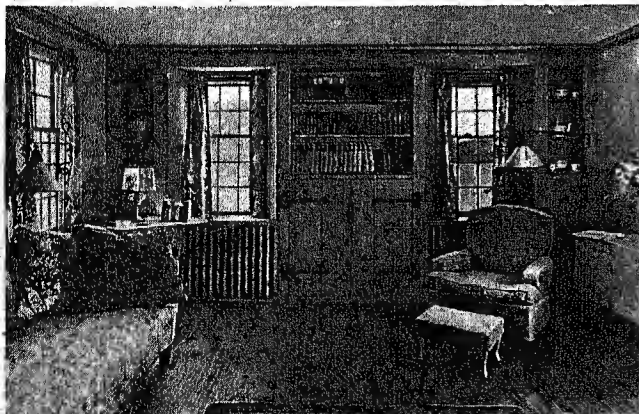
What distresses one in the Empire style is the chair fashioned like the old Roman currule seat, with swans for arms; the cradle supported by four flaming torches; the bed with draperies sustained by sheaves of lances; the dial of a clock apologetically concealed in the wheel of a victorious chariot. The Empire at its worst brings too much war into the home.

The Empire was the last great style before furniture descended into the black walnut horrors of the Victorian era, not to emerge again until modern art sought relief in simple lines, flat surfaces of wood or marble, supports of aluminum, and effects in which the chatter of detail has been silenced.

So-called "Colonial" Furniture

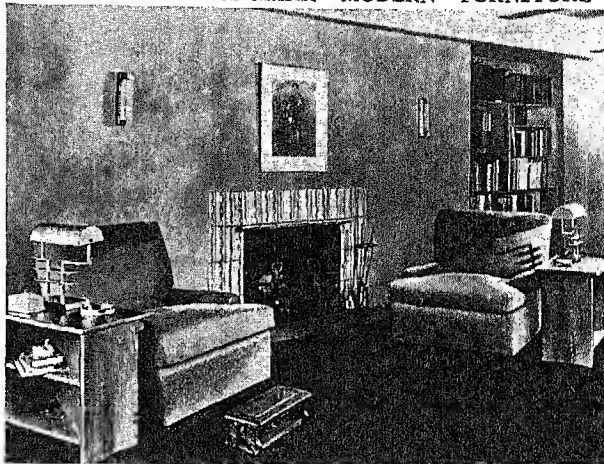
There is one other style, perhaps less a style than an economic condition, which is loosely referred to as

MAKING THE FARMHOUSE DELIGHTFUL



An old-fashioned farmhouse is perfectly at ease with modern overstuffed furniture in its rough crash cover. Floor lamps, books, and curtains are delightfully arranged in this homelike room.

ANGLES AND PLANES MARK "MODERN" FURNITURE



A certain tartness, or crispness, is achieved in a modern room which depends uncompromisingly upon the rectangular form and the straight line. Comfortable, practical, and distinguished are these new rooms.

"Colonial." If the word were strictly interpreted, it could refer only to furniture and other articles produced in the United States before 1776. Yet it is common custom to term Colonial all American-made furniture previous to about 1830. While historically incorrect, the term is artistically sound, as the colonial state of mind, that of dependence on another country, continued in furniture design for 50 years after the American Colonies ceased to be colonies.

The colonists either imported their furniture from the home country, or did their best to reproduce it. They had not the money, the time, nor the skill to copy the elaborateness of Old World models, and their work delights us with its extreme simplicity.

Many "Schools" Merged in Colonial Style

At the time when William of Orange came to the English throne, and the English colonization of America was in progress, the Dutch influence of the king was strong in English taste. Holland was in touch with many nations, and received imports from France, Italy, Spain, Portugal, Flanders, China, and Japan. Dutch, Flemish, and Spanish models of furniture found their way to England, and Anglicized models traveled to the colonies. Thus a chair of distinctly Flemish design might sit in a Puritan home, or a "leather" chair inspired by the Italian Renaissance.

Gradually the chest became all drawers, a "chest of drawers"; when one chest was placed on top of another it became a "chest on chest." If it stood on a high support, the collection of drawers was a "high-boy"; if on a low support, perhaps simple ball feet, it was a "low-boy." ("Boy" was the English modification of *bois*, the French word for wood.) These terms were, of course, not confined to the colonies.

The plain pine and maple of the earliest days later gave way to walnut and mahogany

as the more elegant models were imitated. Duncan Phyfe, skilled cabinetmaker of New York, was the best of the American adapters of Sheraton and Directoire (Empire) styles, and he is famous for his lyre tables and sofas, in which a harp form is gracefully introduced. (See American Colonies.)

Such are the styles of furniture which the centuries have given us to adorn our modern homes. Personal preference, suitability, and one's buying power must be considered in selecting the style of decoration for a house. Many charming rooms are furnished with articles of different styles, but all of a similar feeling. Gilded French furniture can not be combined with Jacobean, but many simple pieces of Empire, Spanish, or early Colonial style look amazingly well in an ultra-modern setting. It is all a

HOW DECORATION EMPHASIZES ARCHITECTURE



The dignified lines of this modern room are respected and strengthened by panels, draperies, placing of pictures. There is just enough detail to avoid monotony.

matter of taste, which Rodin said is "the smile of the maker upon the house."

In a well-built and well-furnished house, good proportion is the first consideration. The

decoration of a room must conform to its architecture. The furniture must not be out of key either in feeling or in size. There should be neither crowding and excess of detail, as in Versailles, nor the bleak emptiness (to most Occidental eyes) of the typical Japanese interior. Beautifully proportioned empty spaces may delight one person and depress another. Modern taste is moving away from fussy de-

tail toward effects won by skilled molding of masses.

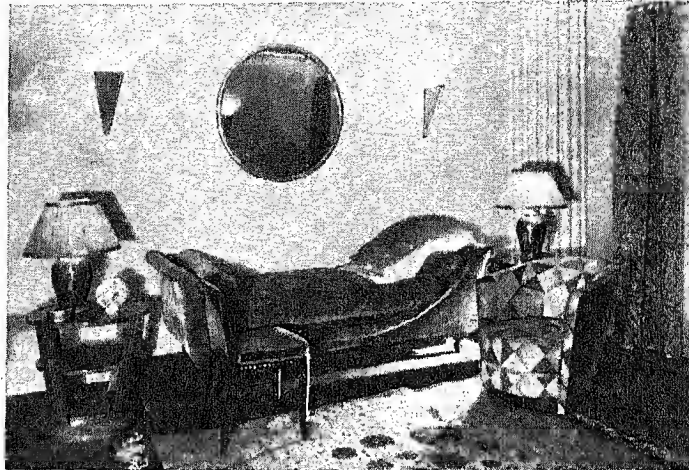
Principles of Room Planning

The room as a whole should be conveniently divided and the furniture grouped according to use. Comfortable seats are placed in warm well-lighted spots. The livable house must have ample space, air, and light, and the decoration should emphasize these necessities. A large-patterned paper on a small room diminishes the size of the room; thick curtains at doors and windows shut out air and light.

A room is usually more pleasant when limited to a few colors than when decorated in many. At least there should be a definite preponderance of one or two colors. Color chords of blue, yellow, and green; crimson, blue, and gold; or of gold and white, are beautiful and restful. Buffs and pale greens give quiet simplicity. As a rule, neutral colors such as browns and grays should be avoided because they do not combine well with other colors, and may in themselves be depressing.

Walls may either form a background for the contents of a room, or they may form its chief decoration. Patterned wall papers afford a better background to furniture than to pictures or bric-à-brac. Landscape papers should not be hung with pictures. Up and down lines increase the height of a room, horizontal lines or a dark ceiling increase its lowness. This fact should be considered in using moldings, paneling, or striped papers. Floral papers are more successful in an all-over design than with spotty unrelated sprays. Conventionalized designs are better than the realistic, as the effects of light and shade in natural rendering of objects give a feeling of various depths, whereas a wall should always look flat. (See Tapestry; Wall Paper.)

A MODERN FRENCH INTERIOR



It is interesting to note how the lines of an Empire bed are adapted in this modern couch, the work of a French designer. The mirror pleasantly emphasizes the round lines in table and carpet design. A background which gives relief, not competition, brings out the full value of the furnishing and drapery designs.

The same is true of floor coverings. A floor should look flat and solid, and not be carpeted with floral effects. Oriental rugs, with their conventionalized designs, are the richest of floor coverings. A worn Oriental is lovely to its last thread, while a worn plain carpet is merely shabby. Oriental rugs are most effective with plain walls, plain draperies, and furniture with little or no pattern in the upholstery. (See Rugs and Carpets.)

Correct Light and Shade

Daylight and lamplight play a great part in the beauty of a room. The comfort of the eyes demands areas of shade. A room should not be lighted throughout, but artificial lights should be spotted at centers of interest. Table and bridge lamps are better than chandeliers and wall brackets. Nothing is more useless than bright lighting of ceilings and walls. Wall brackets needlessly light patches of wall and cut off light beneath them. A chandelier or central light may be suitable in a dining-room, but it should cast its light down, not up. (See Lamps and Lighting.)

Window curtains should not shut out daylight. Thin glass-curtains temper the light and afford privacy. Side drapes are best when hung in long straight folds. Valanced, frilled, or looped effects are usually less attractive. Naturally, figured drapes against a figured wall are out of keeping, since one design competes with another instead of setting it off.

Proper Picture Hanging

Pictures must be related to the room as a whole. They should be hung flat, with no cord showing. Dark pictures must be well lighted; bright ones can be effective in a dark spot. It is best to hang pictures low, with the center of the picture about on the level with the eye. A large picture should not be hung in a small wall space. Small pictures are best when grouped so as to form a composition on the wall. Frames should be inconspicuous. Gilding and carving overwhelm most pictures, even oil paintings. Pictures in strong colors, or of large single objects, or of active, violent scenes, require heavier frames than pictures slight in size, color, or interest. A mat adds importance and size to a picture, and may, if of the

SOPHISTICATED SIMPLICITY



The straight line, or when this is thought too severe, the simple curve, without scrolls or furbelows, mark the modern interior.

right tint, bring out its color harmonies. White mats are harsh, and soft pastel tones much more effective.

No picture will look well in a room unless its colors are in keeping with those in the room. In fact, one of the easiest and best ways of getting a pleasant color scheme is to choose a fine picture, and use its principal colors in the furnishings.

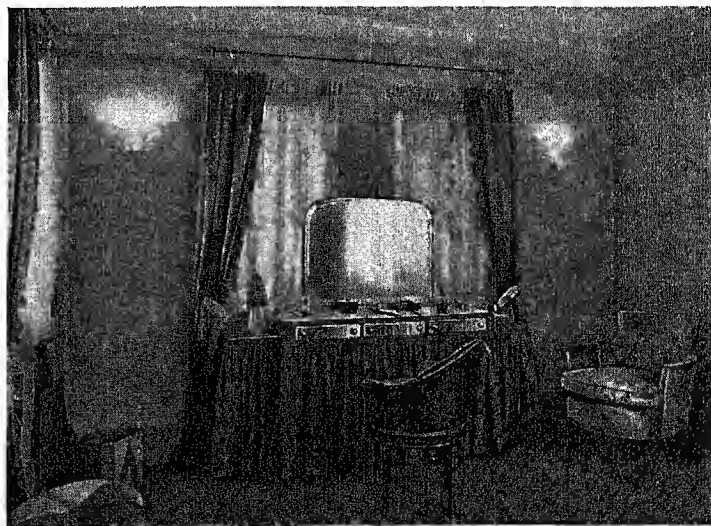
Harmony of Subject

Not only must the colors of pictures be suited to their surroundings, but the subject should also be in keeping with the type of room and with the other pictures in the room. Hunting scenes, attractive in a dining-room, are out of place beside a Madonna or a reproduction of one of the dignified "old masters." Modern pictures, all abstractions and design, are grotesque in conventional or old-fashioned company. Rich,

somber pictures are ill at ease in a delicate, dainty setting, and large pictures dwarf a small room.

A large picture should never be hung above a small or fragile piece of furniture, as it seems likely to crush the frail table or chair beneath. As a rule a picture should be less wide than the piece of furniture beneath it. And all such rules, of course, should be broken if a sure taste recognizes that special circumstances invalidate the rule.

HOW THE NEW MODE COMBINES USE AND BEAUTY



Curtains of plain material, preserving straight lines, plain carpet, and walls plain except for tinted horizontal bands at the top, make a pleasant composition and conform to the proportions of the room. Chairs are sturdy, smart, and comfortable, and the dressing-table has dainty charm and ideal lighting arrangement.

RULES and CUSTOMS that PREVAIL between NATIONS

INTERNATIONAL LAW. The body of rules and customs by which sovereign states are guided in their relations with each other is called international law. It is based only on mutual consent of sovereign states, and it is effective either because the nations of the world recognize that it is to their best interests to accept it, or because stronger nations are able to force their point of view upon weaker ones.

Generally, in ancient and medieval times, international relations were regulated by special treaties between rulers. Among the city-states of ancient Greece there were a few principles of international procedure, such as the protection of ambassadors, but there was no body of recognized law.

The medieval Italian city-states were the first group to work out a code comparable to modern international law. Those city-states were near neighbors, closely allied in blood, bitter rivals in commerce, and often quarreling over religious matters. Out of this situation a few wise rulers developed a system of passports, established the distinction between armies and civilians in war, and set rules for warfare.

Grotius' Great Book

In northern Europe, however, international relations were still based on the right of the mighty to have their way. In opposition to this theory Hugo Grotius, a Dutch jurist, wrote the book '*De jure belli ac pacis*' (Of the Law of War and Peace), published in 1625, which is the cornerstone of international law. Grotius laid down the following principles, to which later jurists and philosophers have added but little: (1) War should be carried on only for a just cause, and for the purpose of defense. (2) Do no more injury to the vanquished than is strictly necessary. (3) Force alone ought not to regulate the relations of peoples, for there is justice between states as well as between individuals. (4) To observe treaties is the wisest practise and the greatest strength of sovereigns.

The rules and principles of international law are obligatory. Incomplete enforcement and occasional violation of it are not regarded by other nations as destroying its status or legal obligation. It is no defense for a nation to point out that its own laws or constitution permit actions which other nations consider a violation of international law.

How International Law is Made

International law is formed by the mutual consent of nations, given either by international practise or by treaty agreement (see *Treaties*). Such practises and agreements may involve only two nations (bi-lateral agreements) or they may extend to many nations (multi-lateral agreements).

Each nation may decide how it shall act to secure respect for its rights under international law. For example, if a nation believes that fishermen of another nation are invading its own fishing grounds, the question may first be discussed by diplomatic representatives. If settlement is not possible in this way,

the question at issue may be referred to an arbitration commission (see *Arbitration*).

In the use of force to redress injuries received, a nation is limited to action proportionate to the original offense. Such action is called *reprisal*. A threat of immediate injury, such as a bandit raid across the frontier, may be met directly by the limited use of force to remove the danger, or indirectly by pressure upon the offending nation. Such pressure or *intervention* in the internal affairs of another sovereign state was formerly regarded as illegal, but is now generally accepted as necessary, especially when the interests of a powerful state are endangered by disorder in a neighboring weaker one.

A nation, to be recognized as such by other nations, must be independent of foreign control and must be willing to live according to international law. Formal, or *de jure*, recognition of a nation is irrevocable, and continues in effect notwithstanding changes of territory, population, and social or political organization, unless the changes destroy the identity of the nation. Thus loss of a large part of its territory after the first World War did not destroy the identity of Turkey; but Austria-Hungary did cease to exist as a nation. Belligerent groups and *de facto* governments, that is, governments actually in power but without full legal authority, may be recognized as such and enjoy a limited status until they give evidence of stability and intent to observe international law.

Meaning of National Jurisdiction

A nation possesses supreme authority or sovereignty, called *jurisdiction*, over all territory, things, and persons within its boundaries. It may also exercise jurisdiction over its own property and its *nationals* and their property in foreign jurisdictions, subject to the jurisdiction of other nations as set forth in international law or treaties. (See *Citizenship*; *Naturalization*.)

Sometimes powerful nations maintain *extraterritorial jurisdiction* in backward countries or countries lacking a stable government. These rights, secured by treaties called *capitulations*, exempt a nation's citizens from control of local courts in countries granting the capitulations; instead their legal disputes, often even criminal charges, are adjudicated by a representative of their own country, such as an ambassador, minister, or consul.

Exempt from the local jurisdiction of any nation are foreign nations as such, their officials, chiefs of state, diplomatic and consular representatives, military personnel, and their property (see *Diplomatic Service*). One nation may not be sued in the courts of a second, nor may legal action be taken against its officials or its property.

Any nation may exercise jurisdiction over persons actually engaged in *piracy* (see *Pirates and Piracy*). This does not, however, authorize the halting, for purposes of inspection, or *visit and search*, of alien

vessels in time of peace unless they are reasonably suspected of being engaged in piracy. Alien vessels beyond the marginal belt of a nation may not be seized for exercise of local jurisdiction unless they have made contact with the shore with intent to injure that nation or violate its laws.

How Nations Gain Territory

A nation may acquire territory by discovery, by purchase, by long continued occupation or by *cession* from another nation. Increases in the territory of a nation by processes of nature, or *accretion*, as in the case of shifting sands making new land, belong to that nation. If boundaries between nations run through bodies of water, such as rivers or straits, they usually follow the middle of the main channel or the middle of the stream, measured from low-water mark. When territory is transferred from one nation to another, private property rights are not affected.

Specific rights of sovereignty may be given up by treaty; if a nation surrenders its right to make war it becomes *neutral*, and if it gives up its right to exclude aliens it is *internationalized*. Other sovereign rights are not affected.

A *littoral* nation, that is one with shore lines, exercises jurisdiction over all lakes and rivers or canals entirely surrounded by its territory, over gulfs which enter the sea by mouths not over six miles in width, and also over the *marginal belt* of the nation along the open coast. This marginal belt extends from low-water mark on shore to an imaginary line three miles out. Sometimes a nation claims wider marginal waters, as the United States in the enforcement of prohibition, but the general rule is not changed. A nation may not close its ports to all alien vessels or prevent "innocent navigation" of its marginal belt by vessels with no harmful intent. Courteous practises of this sort make up the *comity of nations*.

Reservation of Sovereignty

Rights of use and exclusion over territory, adjacent waters, and air, may be transferred from one nation to another by lease or *servitude*, with reservation of final sovereignty. A nation gains rights of use and exclusion, but not full sovereignty, over territory of another nation which it occupies by military force.

A nation may demand the surrender by another nation of territory, things, or persons only on the basis of general law or treaty agreement. It may demand the *extradition*, or surrender of fugitives from justice, only on the basis of a treaty. Extradition is not ordinarily granted for political offenses. Each nation may claim for its nationals the right to travel and trade in the territories of another.

Rules of War

War may not be started without declaration to the enemy and notice to neutrals, though acts permissible only in a state of war, such as *blockade*, bring war into existence even in absence of a declaration. In war, troops must be placed under effective control of national officers, and must be designated by uniforms, flags, or other distinctive marks. Neither poison nor

explosive bullets nor any weapon that causes unnecessary suffering may be used. A *belligerent*, any nation engaged in war, may bar access by sea to the ports of the enemy (see *Blockade*). Religious, philanthropic, educational, artistic, or scientific property of the enemy is exempt from seizure or injury, as well as medical establishments connected with fighting forces. Similarly a mission bearing a white flag, the flag of truce, or giving other adequate signs of intention, may not be attacked or captured. Private property on land may only be *requisitioned*, that is, formally claimed for use, subject to compensation.

Enemy combatants may be captured or rendered incapable of further action, *hors de combat*, by armed forces when encountered in national or enemy territory. But other persons, *non-combatants*, may not be molested unless they use force against the national forces openly, and thus become *combatants*, or secretly, *snipers*. At the outbreak of war, enemy aliens may be expelled from the national territory, interned, or deprived of civil rights. A belligerent may send spies secretly or in disguise into the area of operation of the enemy. A person captured under suspicion of being an enemy spy must be given a military trial and may be punished by death if found guilty.

Treatment of Prisoners

Prisoners of war must be protected in their persons and private property. They may not be imprisoned beyond necessity for safety or discipline, and may not be forced to render military service, though they may be compelled, officers excepted, to render other services at rates of pay prevailing in the locality. They may be discharged on parole with the consent of their own nation. Each belligerent is responsible for the sick and wounded found in his area of operations; these must be given adequate medical care. The dead must be given burial or incineration after identification; lists of prisoners and dead must be transmitted to the enemy from time to time.

Either belligerent may continue hostilities until they are ended by agreement, namely by *truce*, *armistice*, or *treaty of peace*, but continued cessation of fighting by one belligerent may be regarded as ending war, and so surrendering its territory but not its full sovereignty to a military occupant.

Obligations of Neutrals

In time of war between two nations all other nations may remain neutral, at peace with both parties. A belligerent is forbidden to make use of neutral territory. Belligerent forces and material, including war vessels and prizes overstaying the period allowed by law, found in neutral territory are to be interned. A neutral nation is under obligation to enforce its rights against both belligerents and to abstain from aiding either or both. But individual nationals of a neutral nation may engage in transactions with any belligerent government, such as loans of money or sales of ammunition or other supplies.

Belligerent war vessels and prizes may remain in neutral waters or ports only 24 hours unless unsea-

worthy, or on account of bad weather or shortage of supplies. They may secure repairs and supplies enabling them to reach a home port. Only three vessels of one belligerent nation may remain together in a neutral port; if war vessels of opposing belligerents arrive in the same port, they must leave in order of arrival at intervals of 24 hours.

Rights of Neutrals

Private enemy property at sea may be captured unless sailing under a neutral flag, but only after visit and search to determine its liability; resistance lays the vessel open to destruction. Captured property must be taken into port for settlement in a *prize court*, unless necessity, as in capture by a submarine, requires destruction of the prize. In that case, all persons on board the prize and the ship's papers must first be placed in safety.

Freedom of the seas, the right of neutrals to carry on shipping unmolested during a war, is an important principle of international law. Neutral vessels in belligerent ports are liable to requisition, with compensation, for transport service. Vessels at sea are open to visit and search to determine their liability to capture, for breach of blockade, carriage of war materials, called *contraband*, or participation in hostilities, *unneutral service*. If contraband goods are shipped to a neutral, and then sent across the border, or if passed through a blockade, the method is called *continuous voyage*. Neutral prizes may be destroyed under the same rules applying to belligerent prizes.

After the middle of the 19th century international law grew greatly in scope and influence. As international relations became increasingly important, international law was developed as never before in history. The nations not only made more treaties and conventions but they also set forth existing law in systematic form, called *codification*. One of the purposes of the League of Nations was to make international law more effective. (See also Hague Peace Conferences; League of Nations; Neutrality Policy of the United States; Peace Movement.)

INTERNATIONAL SETTLEMENTS, BANK FOR. Although problems constantly arise which require the coöperation of banks in many countries, no international body existed to settle such problems until 1929. In that year the Young Plan succeeded the Dawes Plan for arranging Germany's reparations payments (see World War of 1914-1918). At the same time, the Bank for International Settlements (B.I.S.) was set up to handle reparations payments and other problems of international finance. Its sponsors were the central banks of six nations—England, France, Italy, Belgium, Japan, and Germany. The United States was unofficially represented by a combination of three American banking houses.

Reparations payments ceased after 1931, but the B.I.S. continued to function as a clearinghouse for information and for discussion of international financial problems. Headquarters of this "financial league of nations" were set up at Basel, Switzerland.

How NATIONS of the WORLD TRADE with ONE ANOTHER

INTERNATIONAL TRADE. If you had coffee or bananas on your breakfast table today, if you are wearing silk stockings, or if you have used the eraser on your pencil, you have benefited from international trade. For the coffee and bananas came from countries south of the United States, the raw silk for your stockings came probably from Japan, and the rubber in your eraser almost certainly came from the Netherland East Indies or the Federated Malay States. Every day you use many other articles that have come from foreign countries.

You also use a great number of things which were made in your own country from raw materials that were imported. Many of our great factories would have to shut down if they were forced to do without materials from other lands. Into the manufacture of our automobiles goes cork from Algeria or Portugal, tin from Malaya or Bolivia, chromium from Rhodesia, shellac from India, long-staple cotton from Egypt. Manufacturers of tires, telephones, electric wiring, radios, and a thousand other things necessary to our everyday life need rubber from tropical lands. Vanadium from the Andes of Peru is combined with American steel to make a tough strong alloy that is necessary for our locomotives. United States manufacturers need Canada's nickel for rails, bridges, ordnance, and many parts of automobiles; they need

tungsten and antimony from China, manganese from Russia, and tin from the Netherland East Indies for a hundred and one articles, from tooth-paste tubes to industrial machinery.

These countries, because of differences in climate or in natural resources, have mineral or vegetable products that America lacks and needs. America likewise has products that other countries cannot supply for themselves. This, then, is a basic reason for international trade—that countries may procure necessities or luxuries that they cannot produce themselves.

Specialization and International Trade

But, you may point out, nations buy from other nations things that they *could* produce themselves. The United States could and does grow sugar. Why, then, does it import a great quantity of sugar from Cuba? The answer to that question brings out a second basic reason for international trade. We live today in an exchange civilization, which is based on *specialization*, or *division of labor*. We, as individuals, each do one particular kind of work and use the money we earn to buy from others the things we need. In this way we can enjoy many more things than we could if each of us had to produce everything that he uses. The same is true of countries. Each country specializes in the things it can produce most advantageously, and by exchanging its products with other countries

it obtains a larger quantity and a greater variety of goods than it could produce for itself. Sugar can be grown much more cheaply in Cuba than in the United States. But the United States can manufacture iron and steel products and machinery more cheaply than Cuba. It is economical, therefore, for the United States to sell these products to Cuba, and to use the money received for them to buy Cuba's sugar.

Sometimes it may even be profitable for a country to import a commodity which it could produce more cheaply than the country from which it buys, because there are other commodities which it can produce still more advantageously. The United States, for example, could grow flax for fiber more cheaply than Ireland or Germany, but it may be better for the United States to grow the crops for which it has an even greater advantage, such as wheat and cotton, and to buy its flax and linen. This is an example of what economists call the *law of comparative costs*: A nation tends to specialize in the production of those commodities which yield the greatest returns and to import those in which its advantage is not so great.

Specialization Increases Interdependence

As countries specialize to a greater and greater extent, they produce much larger quantities of their special products than they can use at home. They therefore become increasingly dependent on foreign markets to buy their surplus, as well as on foreign imports of the commodities they do not produce. Most primitive peoples, as we know, produce all the things they use; but their standard of living is low, and they get along with only the barest necessities of food, clothing, and shelter. Pioneers in new countries, such as the American colonists, produce a large proportion of the things they need; but they soon begin to establish the industries for which the country is best adapted and to send their products to the older countries in exchange for things that will make their lives more comfortable. Thus international trade makes it possible for nations to develop their resources, build up their industries, and, by producing special products in large quantities, to lower the costs of production.

Countries, such as England, with a large population, a small area of arable land, and good facilities for manufacturing, tend to become highly industrialized and to import their foods and many raw materials. Other countries, such as Brazil, Argentina, and other South American republics, develop into agricultural and raw material nations, exchanging the products of their farms, forests, and mines for the manufactured products of the industrial nations. The United States has developed into an industrial nation, but, because of its vast area and rich natural resources, it continues to produce a surplus of raw materials and foodstuffs which make up about a third of its exports.

Industrial nations not only trade with raw material nations, but they also do a great deal of trading among themselves. European industrial countries, we are told, do more trading with one another than

they do with agricultural countries. They also buy three-fifths of the manufactured articles exported by the United States. Specialization, of course, is the reason for this. Natural resources, character of the country, climate, labor conditions, special aptitudes of the population, and other factors may help to determine what products a country shall specialize in.

Look at the major exports of various countries and you will see how each one tends to specialize. China and Japan export silk to the rest of the world. India supplies much of the tea that the world drinks and also a large part of the world's jute. Holland's cheese and Denmark's dairy products have widespread markets. Switzerland's fine watches are known the world over. And many countries depend on industrial machinery made in the United States.

Foreign Trade: Its Meaning and Its Value

We have been using the term *international trade* for trade between nations. The trade of each individual nation with other nations is called its *foreign trade*. The total amount of a nation's foreign trade in merchandise is the amount of the goods it buys, or *imports*, plus the amount of the things it sells, or *exports*. The buying and selling are, of course, done chiefly by individual merchants or firms and only to a small extent by governments.

The following table gives the value of the *per capita* foreign trade of some leading countries in a typical prosperous year. The greater the trade per capita, the greater is the country's specialization:

<i>Per Capita Foreign Trade</i>	<i>1929</i>
Denmark.....	\$266
Netherlands.....	243
Switzerland.....	228
Great Britain.....	219
France.....	103
Germany.....	100
United States.....	79
Japan.....	32
British India.....	6.5
Russia.....	5.7

In the total amount of trade carried on, Great Britain now usually leads the world. Over a recent five-year period the percentage of world trade in merchandise done by Great Britain varied from 11 to 15 per cent. The United States had from 10 to 15 per cent. Germany's percentage varied from 9 to 12; and that of France, from 6 to 7. These four countries do about 40 per cent of the world's trading, which in 1929 was valued at about 68 billion dollars and in 1935, at about 25 billions. (You will find a list of the leading exports and imports of these and other countries under Commerce in the Fact-Index.)

Foreign Trade of the United States

The United States exports only from 7.5 to 10 per cent of the goods it produces. The remainder is consumed at home. This small percentage, however, is very important to the country's economic welfare, for certain industries depend on foreign markets to buy a much larger proportion of their output. Cotton, for example, one of the leading crops of the United States,

has long been its chief export. About half of the annual crop goes to other countries. More than a third of the production of leaf tobacco, another large crop, is exported. Foreign countries buy half the phosphate rock, copper, turpentine, rosin, and sardines produced in the United States, and from a fourth to a half of all American-made sewing machines, printing machinery, office appliances, agricultural machinery, and aircraft.

About 50 per cent of the exports usually consist of four kinds of goods:

Exports	1929	1935
Cotton, unmanufactured.	\$771,000,000	\$391,000,000
Machinery	612,000,000	265,000,000
Petroleum and products.	561,000,000	249,000,000
Automobiles and parts . .	539,000,000	227,000,000

A wide range of products is included in the other 50 per cent, for the United States exports everything from abrasives to zinc.

Great Britain, the chief customer of the United States today, receives about one-fifth of the country's commodity exports—chiefly cotton, tobacco, and manufactured goods. Canada is usually the second best world customer; Japan is third, and France is fourth. Germany, Italy, Belgium, and Sweden are other leading European markets for United States goods. Europe takes nearly half of the exports and supplies nearly a third of the imports that enter into the foreign trade of the United States (see charts on page U-197).

The United States is self-contained to an exceptional degree and needs a smaller proportion of imports than most other countries to meet its needs. Yet some of its leading industries are dependent on imports for their raw materials; and the high standard of living of the American people leads to the importation of a number of products

that might be classed as luxuries. Four products usually make up about one-fourth of the imports:

Imports	1929	1935
Raw silk	\$427,000,000	\$ 96,000,000
Coffee	302,000,000	137,000,000
Crude rubber	241,000,000	119,000,000
Cane sugar	209,000,000	133,000,000

Other products that are imported in large quantities are paper and manufactures, wood pulp, vegetable oil, tin, chemicals, fruits and nuts, furs, burlap, and wines and spirits. Besides these classes of goods, the American people demand all sorts of luxuries from many different countries. They buy, for example, Russian caviar, English tweeds, French perfumes, Brussels lace, Swiss watches, and African diamonds.

Visible and Invisible Items

When we speak of a country's foreign trade, we usually mean the merchandise it exchanges with other countries. The goods exchanged by nations are called the *visible items* of international trade. And gold and silver bullion which a nation imports or exports is a visible item.

Besides these tangible goods, nations also exchange services of various sorts, which economists call the *invisible items* of international trade. These invisible items are tremendously important in any consideration of the trade between nations, as we shall see. They include such kinds of transactions as these:

1. Payment for freight. England, for example, has a large share of all the ships in the world, and receives large sums of money for carrying goods for the people of other nations.

2. Payment for insurance. Insurance companies insure foreign firms or individuals.

3. Tourists' expenditures. Travelers from another country spend money for hotel accommodations, guides, railway fare, and services.

HOW TO READ A BALANCE OF PAYMENTS TABLE

The following table is taken from a bulletin of the United States Department of Commerce. This method of showing the balance of international payments is used in many publications on foreign trade.

UNITED STATES BALANCE OF INTERNATIONAL PAYMENTS, 1935 (IN MILLIONS OF DOLLARS)

Item	Receipts from Payments to foreigners for "exports" (credits)		Net foreigners for "imports" (debits) or credits (+) or debits (-)
Trade and service items			
Merchandise	2,388	2,133	+255
Freight and shipping	63	99	-36
Tourist expenditures	117	409	-292
Immigrant remittances . . .	5	92	-87
Charitable, educational, & other contributions		28	-28
Interest and dividends . . .	521	146	+375
Government transactions . .	28	83	-55
Miscellaneous services . . .	116	40	+76
Total	3,238	3,030	+208
Gold, silver, & currency			
Gold exports & imports . . .	2	1,741	-1,739
Silver exports & imports . .	19	355	-336
Paper currency movements	30	31	-1
Capital items			
Reported movement of short term banking funds . . .			+970
Reported long term capital movements	2,009	1,547	+462
Miscellaneous capital items . .			+105
Residual item			+331

If you add all the plus items in the last column and all the minus items, you will find that the sums are equal—that is, that the imports and exports balance. In international finance, the invisible items are considered as "exports" and "imports" just as if they were goods. For example, when an American immigrant sends \$100 to his old mother in Germany, the item is treated as though it were payment for an import of goods of that value. The movie royalties paid by foreigners to American investors are treated as exports from the United States.

There is usually a "residual item" in Department of Commerce statements because of inability to estimate exactly all the current invisible items and credit transactions or because of smuggling or incorrect valuations placed on commodity exports and imports.

The figures for 1934 and 1935 are unusual because gold and silver imports were greater than for any other years in the country's history, as a result of the high prices paid for these metals by the United States government under its "managed money" policy.

4. Immigrants' remittances. Money is sent by immigrants to their families in their homelands.

5. Investments. Individuals, corporations, and banks invest capital in the industries of foreign countries and lend money to foreign governments.

6. Bankers' commissions. Bankers in one country perform services for the citizens or corporations of another country, for which they are paid commissions.

Let us see how these invisible items change the picture of international trade.

Balance of Trade

As you read about international trade in newspapers and magazines, you will find much discussion of the *balance of trade*. In a given year, for example, the United States may send to other countries $4\frac{1}{2}$ billion dollars' worth of goods. It may receive from other countries only 4 billion dollars' worth of goods. The newspapers would then say that the United States had a "favorable" balance of trade of half a billion dollars—that is, its merchandise exports were greater in value than its merchandise imports.

Two or three centuries ago a school of economists called Mercantilists believed that a favorable balance of trade was necessary to the economic welfare of a country. They believed that if a country had an "unfavorable" balance of trade it would have to ship out its gold and silver to make up the difference and that it would soon be without money.

Many people still believe in the desirability of a so-called favorable balance of trade, but, like the economists of another generation, they fail to take account of the invisible items. A nation may export more goods than it imports and still owe money to other nations for services they have performed. Again, a nation may import more goods than it exports and still have a favorable balance when the value of its invisible items is added. In 1930, for example, Great Britain imported more than 5 billion dollars' worth of goods and exported only 4 billion dollars' worth. It would seem, then, that Great Britain had an unfavorable balance of trade of one billion dollars. But if you add all the money that was paid to Great Britain for carrying goods, for insurance and banking services, by tourists, and so on, you will find that the unfavorable balance was more than offset by these items.

In any consideration of the status of a country's international trade, the invisible items must be taken into account and the total *balance of payments* must be considered. Only in that way can a true balance of trade be shown. In the long run, of course, no country can continue indefinitely to have either a favorable or an unfavorable balance of total trade, *for imports have to be paid for by exports* (the economic *Law of Reciprocity*). In other words, a country can buy only to the extent that it can sell, either in goods or in services, and the total volume of trade depends upon the total volume of production (called *Say's Law*). These principles were proved on a world-wide scale during and after the World War of 1914-1918.

Creditor and Debtor Countries

When the war broke out in 1914, the people in the United States were in debt to the people in other countries to the extent of $2\frac{1}{2}$ billion dollars; so the United States was a *debtor country*. Since the early days of the Union, Americans had been borrowing from other countries to establish industries, to build railroads, and to pay for public works. But during the war other countries began to borrow from the United States to buy food and munitions; and after the war the United States was a *creditor country*, to which other countries owed $12\frac{1}{2}$ billion dollars net.

The interest on this money amounted to several hundred million dollars a year. In addition, the United States exported more goods than it imported, and so other countries owed the United States several hundred million dollars a year for goods. This was partly balanced by invisible items. But a balance of several hundred millions remained to be paid by other countries. They could meet these yearly payments only by increasing their exports to the United States until their exports were greater in value than their imports, or by further borrowing. Since the United States discouraged the former course, the debtor countries were forced to borrow additional sums in the United States. This process was bound ultimately to break down, as it did in 1929, when American banks ceased making loans. European buying was immediately curtailed, and a world-wide business depression followed. Prices shrank and world trade fell to only a third of its former value and to only three-quarters of its former volume.

England for many decades has been lending money to other nations. But it has usually been willing to allow debtor countries to pay the interest on their loans by shipping goods to England. The United States faces the problem of whether or not it wants to become a larger and larger creditor nation. If it does not, it probably will have to permit other countries to ship it more goods than it ships them.

How People Pay for Foreign Goods

If all countries had the same money units, one of the most difficult problems of international trade would be solved. But one country's money is not good in another country, and so an elaborate machinery is necessary to handle international trade transactions. If you should order some chinaware from an English firm, you would have to pay in pounds. How would you go about paying your bill?

It is the two-way character of trade that solves this problem. Merchants in the United States are always buying goods in England, and English merchants are always buying goods in America. Suppose a man in New York wants to buy \$1,000 worth of china in England and a man in London wants to buy \$1,000 worth of typewriters in the United States. The business would be simple if the New York buyer of china could pay his bill in dollars to the American typewriter firm and the London buyer of typewriters could pay his in pounds to the English china firm.

This, in principle, is just how international trade is carried on. But the transaction is handled not by individuals or firms but by the great international banks. An American bank sets up a branch in London or opens an account with an established English bank. Such a bank is able to pay the American exporter in American money and the English exporter in English money. It does not, however, "match up" single transactions such as those described above. It operates by the use of credits obtained through sales of goods to the country in which it is situated.

A New York exporter, for example, makes out a bill of exchange for goods which he has sold to a merchant in London. He sells this bill to his New York bank and receives his money. The New York bank sends the bill of exchange to its London branch, which asks the London merchant for payment. The latter pays the amount of the bill to the bank in pounds. The bank, instead of sending the money to the New York bank, keeps it and uses it

to pay a London manufacturer who presents a bill of exchange for goods sold to a New York customer. The bill of exchange is only one of a number of credit instruments used in international trade (see Credit).

The transaction, of course, is not usually so simple as this, for much of international trade is three-cornered or even four-cornered. Suppose Argentina buys American automobiles. The United States does not buy Argentine beef or wheat, but England does. So England pays Argentina for its wheat and beef at a London bank; Argentina then uses this credit to pay the United States. But the United States, which has been buying English goods, uses this same credit to pay its English customers. Thus all three countries settle their debts without actual transfer of money.

When trade between two countries becomes too one-sided, the large buyer may not be able to get enough of the small buyer's money (or bills of exchange) to pay for its imports. This is what causes rates of exchange to rise and fall (see Foreign Exchange).

Governments and International Trade

Most of the world's trading is done by private business interests, rather than by governments. Governments, however, have always regulated the foreign

trade of their nations to a greater or less degree by legislation and treaties; and a government's foreign trade policy always has an important place in its economic program. In the United States it is one of the vital questions on which presidential campaigns are fought (see Political Parties). In Russia foreign trade is a government monopoly, and in Italy and Germany the governments have taken almost complete control of the trade with other nations.

Almost all governments have set up *tariffs*, that is, taxes on goods imported from foreign countries (see Tariff). Through commercial treaties, governments make special agreements with other governments regarding the importation of certain goods. They also make "most favored nation" agreements with other nations. By such an agreement two nations guarantee that all trade favors or concessions granted by either of them to a third nation shall immediately be granted to the other contracting nation.

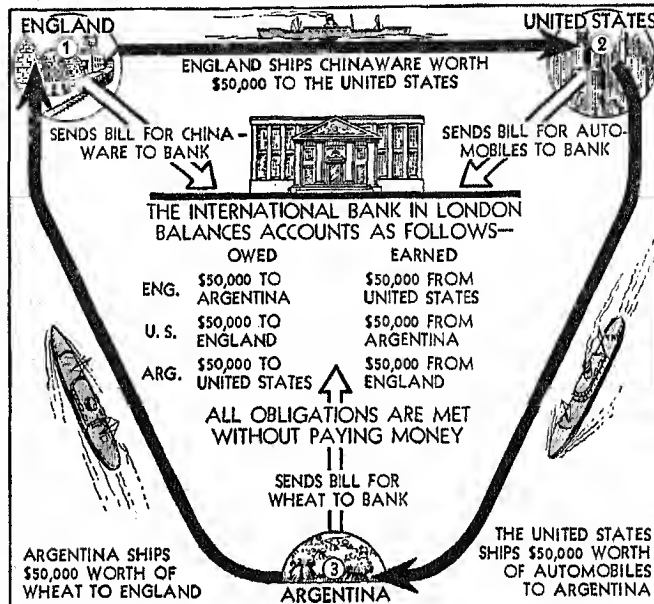
Thus, to all nations on its "most favored" list the United States extended the benefits of tariff reductions negotiated with any one country under the Reciprocal Tariff Act of 1934.

Protecting Health and Increasing Trade

Among the routine functions of governments in international trade is the regulation of imports to protect the nation's health and its plant and animal life. The quarantines and embargoes that are placed by the United States on certain agricultural products are examples of this type of regulation. Such a *quarantine* holds up the entrance of a plant, animal, or other product suspected of being a carrier of a pest or disease until it can be inspected. An *embargo* prohibits a product from being brought into the country.

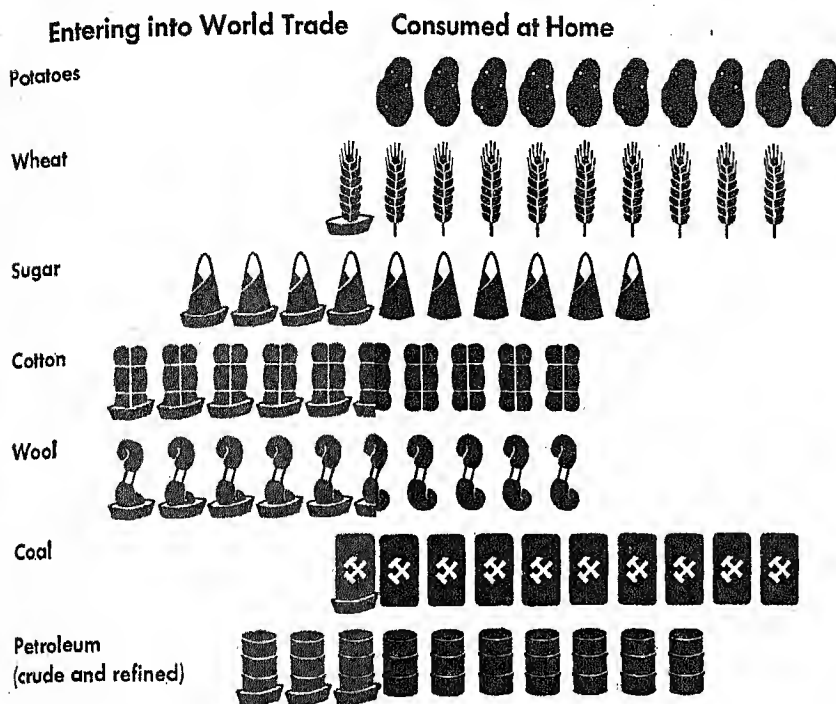
Most governments also have special departments that assist in developing their foreign trade. In normal times they maintain consuls in the leading commercial centers of the world. The consuls seek out new opportunities for their merchants and financiers at home, and also assist citizens who are carrying on business abroad (see Diplomatic Service). Besides its consular service, the United States has a Bureau of Foreign and Domestic Commerce and a Division of Commercial Treaties (see United States Government). Cham-

HOW THREE-CORNERED TRADE IS CARRIED ON



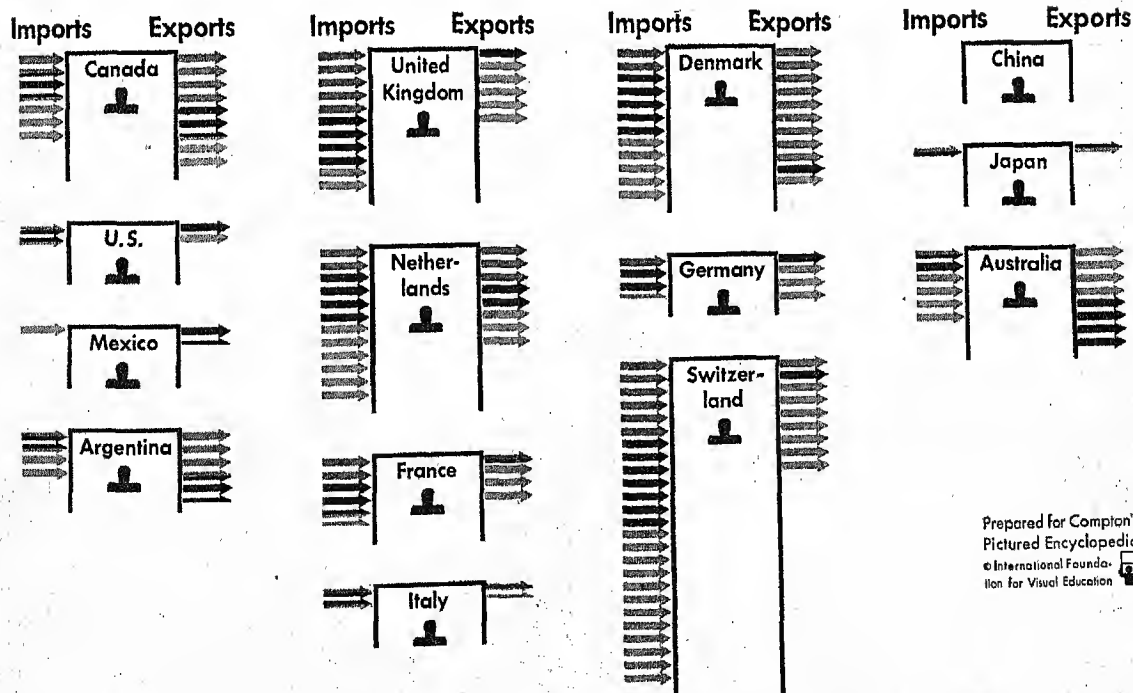
London is the world's greatest clearing house for the debits and credits arising from international trade. Often the transactions of three or four or even more countries are involved in making accounts balance.

Percentage of Important Commodities Entering into World Trade



Each complete symbol represents 10% of total world production, 1931-1935

Per Capita Trade in Various Countries



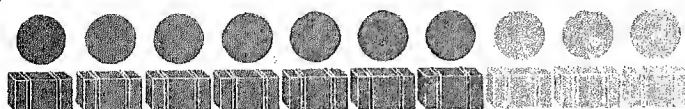
Each complete arrow represents merchandise to the value of 5 gold dollars, imported or exported per year, 1931-1935
 green: foodstuffs · black: crude materials and semi-manufactures · red: finished manufactures

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 tion for Visual Education

International Trade Since the World War of 1914-18

Standard year

1913



Annual average

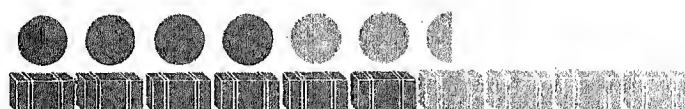
1921-1925



1926-1930



1931-1935



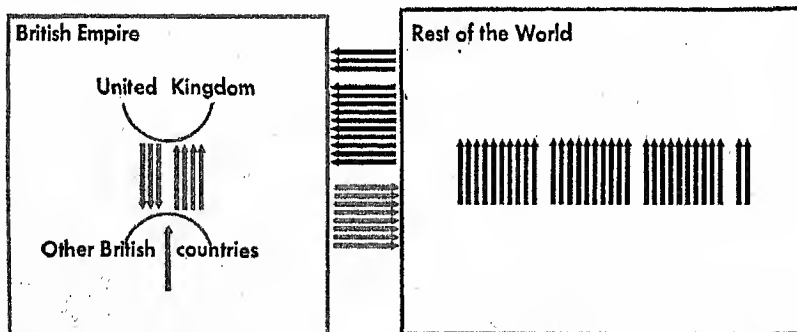
Each complete circle represents 10% of the value of the total exports in 1913 (2000 million gold dollars)

Each complete box represents 10% of the quantity of the total exports in 1913

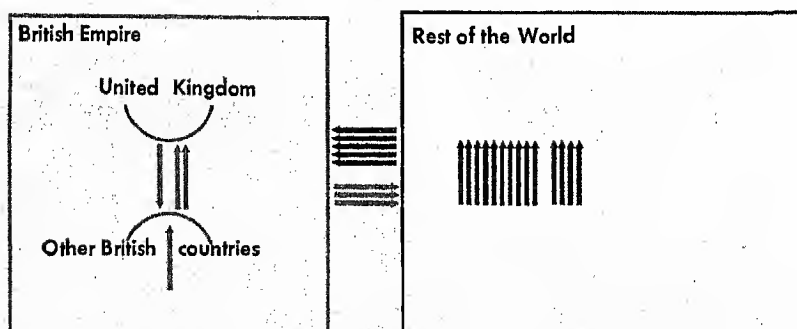
blue: from United States red: from Europe gray: from the rest of the World

Foreign Trade of the British Empire and the Rest of the World

1926-1930



1931-1935



Each arrow represents exported merchandise to the value of 500 million gold dollars

red: goods originating in British Empire

bers of commerce in the United States and other countries cooperate with government agencies in the task of expanding foreign trade.

Growth of International Trade

During the 19th century international trade grew rapidly, largely as a result of the Industrial Revolution (*see* Industrial Revolution). Many countries developed into vast workshops and began to exchange their factory products for agricultural products and raw materials. Since mass production makes products cheaper, manufacturing industries expanded, specialization increased, and there was a growing demand for foreign markets for surplus output. As populations grew, large numbers emigrated to new countries; and the demand of the young countries for goods they could not produce stimulated international trade.

Banks and individuals invested immense amounts of capital in foreign countries—especially in the younger countries, such as the United States, which were thus enabled to expand their industries and establish new ones. Railroads linked seaports with the interior. With the coming of the steamship, ocean freight rates were reduced, so that even bulky goods of low value could profitably be shipped to distant manufacturing centers. The world was becoming more and more interdependent, and the value of world trade was doubling about every 20 years. It was nearly 3 billion dollars in 1840; 7 billions in 1860; 14 billions in 1880; 20 billions in 1900; 40 billions in 1913.

From Great War to Great Depression

The World War of 1914–1918 brought far-reaching realignments of trade among nations. Warring nations strained their resources to meet their needs and borrowed heavily to buy supplies from neutral countries, which increased their production manifold to meet the unusual demand. After the war, they continued to borrow credit and to import goods at increasing prices. Thus, as the upper chart on the opposite page illustrates, the value of Europe's exports in the period 1921–25 merely equaled that of the year 1913, while the United States and other countries showed a substantial increase. The day of reckoning came, as we have seen. Some nations could no longer borrow and buy, other nations lost their markets, and the result was the world depression of the 1930's.

With the collapse of normal trade, nations set up trade controls intended to increase their exports and reduce their imports. Each sought thus to bolster its own faltering economy. But the obvious drawback in this was that one nation could not profit without others losing, and so all were ultimately bound to suffer from burdensome restrictions. France led the way in placing quota restrictions on imports to build up its own industries. A *quota* limits the quantity of certain products that may be imported from a particular country in a specified period. Many of the leading nations also devaluated their currency in an effort to give their products a more favorable position in world markets (*see* Money). Campaigns were launched, for example, to "Buy American" or "Buy

British," with the object of stimulating domestic production and curtailing imports.

Economic Nationalism after 1929

These devices were offshoots of the policy of *economic nationalism*. Under this policy a nation seeks to make itself as nearly self-sustaining as possible. It imposes tariffs, quotas, and similar restrictions on imports, and renders government aid to domestic industry and agriculture. Such relatively mild measures of control were adopted by many governments after the depression of 1929.

Economic nationalism took a new form, however, in the foreign trade policies of the National Socialist régime in Germany after 1933. The essential feature of these Nazi policies was that foreign trade was made the weapon of a war economy. Germany's object was to free itself from dependence upon countries whose supplies might eventually be cut off by a military blockade. *Autarchy*, or complete economic self-sufficiency, was the aim of the Nazis, and this aim shaped their dealings in international markets.

Totalitarian Methods of Foreign Trade

The methods they used were not entirely new. Quotas, tariffs, and the granting of government subsidies to export industries—these were employed to eliminate "nonessential" imports and to build up credits abroad. Where no credits existed, Germany negotiated *barter agreements* to obtain vitally needed raw materials. In these transactions no money is exchanged, and so they are often called *clearing agreements*. Germany received copper from Chile, let us say, and paid for it with credit for the equivalent in value in German goods. The credit was entered in a "blocked" account that could be drawn upon only by Chilean importers and only for the purchase of certain specified commodities. The unit employed in these blocked accounts was the "Aski mark." This was not actual currency but merely credit in German banks that could be redeemed by foreign owners for certain restricted purposes. Barter agreements are called *bilateral* since they involve only two nations, in contrast to the *multilateral* (three- or four-cornered) trade that normally prevails.

The advantages of the barter system to Germany were plain. It was enabled, despite its lack of gold and credit, to obtain the supplies it needed. Barter agreements were negotiated chiefly with the nations of southeastern Europe and Latin America. These nations were induced to trade on this basis by the offer of better prices than could be found elsewhere. The German government accomplished this simply by reducing the value of the Aski mark (thus increasing the value of the buyer's currency) to a point which drove all other foreign competitors from the market. The Nazis were willing to accept temporary losses to obtain raw materials for war and to draw new nations into their economic sphere of influence. German foreign trade policies were thus inescapably linked with the totalitarian system, for only a government with dictatorial power at home could carry through such measures abroad. (*See also* Germany.)

The intensified struggle for markets growing out of these German trade practises was one of the contributing causes of the war that broke out in Europe in 1939. Like the World War of 1914-1918, the new war dislocated trade all over the world. Each side waged "economic war" upon the other. The weapons were blockade (*see* Blockade), embargoes, rationing systems, and all the other devices by which a warring nation seeks to win for itself and to cut off from the enemy the world markets which are indispensable to military victory. That the new war would bring a reorganization of international trade even more far-reaching than the last was clear even at the outset of the conflict. (*See also* Europe.)

Interdependence or Economic Nationalism

The war in Europe and the "trade war" which preceded it raised in the United States the question of how far the nation could and should become economically self-sustaining. Advocates of the policy of self-sufficiency say that involvement in the world's trade means involvement in its quarrels. They point out that the United States could come nearer to supplying its own needs than any other nation, except perhaps Russia. Only some 10 per cent of the nation's income normally comes from its foreign trade, and it is argued that the United States would do better to sacrifice much of this than to continue to suffer the instability, the rivalries, and the conflicts that attend international competition.

But if the United States were to become a hermit nation, it is evident that its industry and agriculture would have to be reorganized and that substitutes would have to be found for many commodities now essential to the country's standard of living.

Foreign Trade and Agriculture

If foreign markets were permanently closed to United States goods, it was estimated by Secretary Henry A. Wallace in 1933 that 40 million acres of land normally cultivated would have to be retired or put to different uses. This land supports a farm population of 3,200,000. It is estimated that the industrial population directly dependent upon export sales is more than twice as large as the agricultural population. Thus, in normal times more than 10 million people depend for their living upon exports of farm and factory products, besides the great number engaged in transportation and distribution. Radical changes, therefore, would be necessary in the economic organization of the country. Moreover, cutting down mass production would bring higher prices at home. And even though substitutes could be found for many of the raw materials that are imported, they would necessarily be more expensive.

So for the United States, as for all countries, the great question was whether economic nationalism was to prevail or whether the nations could work out some form of international coöperation. The answer to this question depended upon the kind of world which would emerge from the war. (For further information about international trade, *see* Commerce.)

INTERSTATE COMMERCE COMMISSION. Suppose railroads could charge whatever they chose for carrying passengers and freight. In that case they might give certain individuals or companies lower rates than others for the same service. This discrimination would cause the favored persons or companies to succeed, while their competitors would fail or work at a disadvantage. In a similar manner the railroads might favor one section of the country more than another, by differences in rates and quality of service. When fruit and vegetable crops were ready to be shipped, if the railroads failed to furnish cars sufficient to get these perishable crops to market quickly, growers and shippers would suffer great losses.

In the early days of railroad development in the United States, such discriminations were common, and regulation by the different states was found to be ineffective in all but a few classes of cases. Public opinion thereupon demanded action by the United States government. Accordingly, an Interstate Commerce Commission was provided for by act of Congress in 1887. The powers granted under this act, as interpreted by court decisions, were found to be insufficient, and regulation did not become fully effective until the passage of the Elkins Act (1903) and the Mann-Elkins amendments (1910). The Commission has eleven members and a large administrative staff. It is charged with seeing that railroad rates and service are fair and reasonable, that cars are distributed fairly, and that no discriminations occur. Railroads are required to publish their rates.

The Commission also can act to help the railroads when needed. It is charged by law to give efficiently managed railroads a chance to earn a fair return upon their capital. It can even set aside orders of state authorities if they result in discrimination against interstate commerce.

Most of the Commission's activities result from complaints by shippers, by city or regional business associations, or by the railroads themselves. After due hearing, the Commission issues its order, which must be obeyed forthwith, though appeal can be taken to the Federal courts, and the order may be set aside. The Commission also acts on its own initiative in certain matters, such as devising a plan for combining the railroads into larger systems. It also carries out investigations ordered by Congress.

The Commission controls such other interstate common carriers as sleeping-car companies, express companies, oil pipe lines, and, by the Motor Carrier Act of 1935, highway truck and bus lines. It also regulates combined rail and water rates. The finances of all regulated companies are subject to its supervision.

These powers are based on the clause in the United States Constitution which gives Congress power to "regulate commerce among the several states." While the Commission deals mostly with interstate commerce, its power extends to commerce within a state when necessary to protect interstate interests.

INVENTIONS *That Have CHANGED the WORLD*

INVENTIONS. What good have inventors and inventions done for mankind? For part of the answer, think of the earliest days of the human race, and consider how all mankind got up every morning.

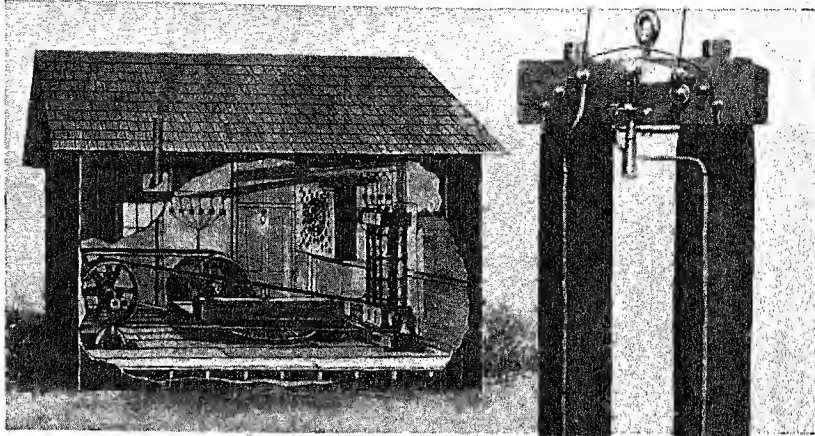
The earliest men undoubtedly slept under bushes or in caves. When they woke up about daylight, they looked first to see if any ferocious beasts were lurking near, then probably crept to the closest spring or stream for a drink of water. After this they ate breakfast wherever they could find a berry bush, a bird's nest with eggs, or roots which they could claw up with their fingers.

Today we may wake up when an alarm clock rings, and in winter we may turn on a light. Behind each act stands a host of inventors. Before we could use an alarm clock, somebody had to invent the alarm. Before him, somebody had to invent clocks. Still earlier inventors had to find out how to extract metals from ores and make the metals into objects such as clocks. And before anyone could set a clock correctly, somebody had to learn how to tell the correct time from the sun and the stars.

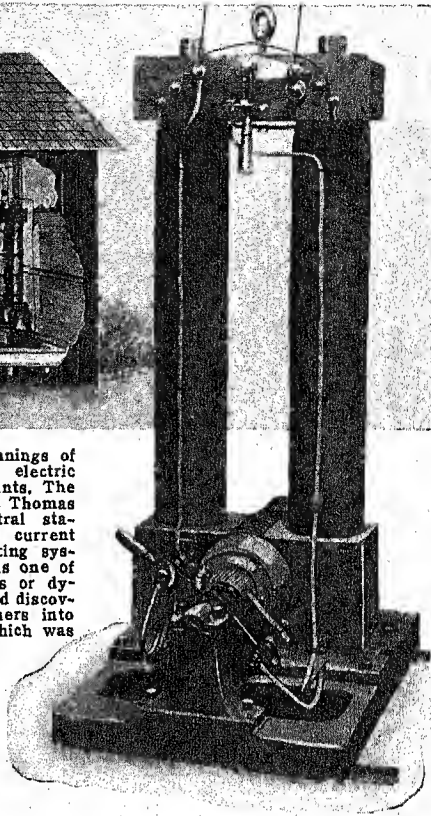
So, also, behind our simple act of turning on an electric light stands a long and brilliant record. It starts back in the sixth or seventh century before Christ, when Thales of Miletus rubbed a piece of amber, then used it to attract straws and other light objects. From that early experiment with electricity the record runs through some twenty-five centuries, down to Thomas Edison, the man who built upon all the earlier knowledge to get light, as some people said, from "a hairpin in a bottle."

The record is without end. Almost every object we use, almost every service which is performed for us, we owe to some inventor. We can fairly say that the whole story of civilization rests upon invention as its foundation. Even the very thoughts of man could hardly accomplish much until somebody invented writing to preserve thoughts from age to age and spread them widely among all men.

All this looks toward the past and counts the benefits which we owe to the inventors of earlier times. But if we look toward the future, the story is the same. If people in the ages to come live more easily and richly than we do, inventors will have contributed much or most of the advances. Invention will continue to be, as it always has been, one of the strongest driving forces in human affairs; and we



Here are the beginnings of our huge modern electric light and power plants. The picture above shows Thomas Edison's first central station for furnishing current to an electric lighting system. At the right is one of his early generators or dynamos. It combined discoveries made by others into the first machine which was efficient enough to be commercially useful. From these beginnings, in the early 1880's, came the developments of electric lighting and power as we know them today.



can hardly understand the past, our present lives, or the prospects for the future, unless we understand inventors and their work.

The Nature of Invention

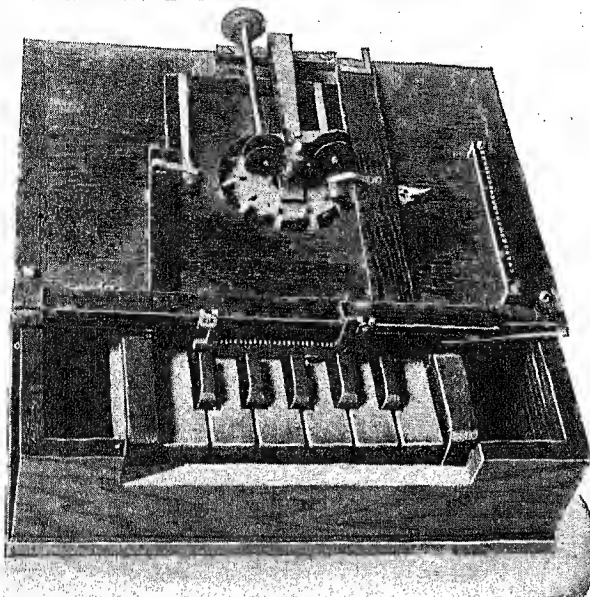
Today invention is usually an intricate and highly scientific process, and most of it is done in splendidly equipped laboratories and workshops. The task begins as a rule in answer to a need. An industry may want a machine, or a fabric, or a paint which will render a new kind of service. Experienced designers or research men are set to work. They may call upon a dozen sciences for help and ransack the earth for materials. The first product may cost thousands of dollars, although the same article made later by mass production methods might cost only a small sum. But if the need is great enough, the invention will probably be made.

Such highly specialized work is difficult to understand, if we try to examine it in its present highly developed state. We can understand inventors and inventions better if we go back to the beginning and see how invention got a start, away back in the dawn of human progress, thousands of years ago.

The Earliest Discoveries and Inventions

Nobody knows how the earliest inventions were made, but we can make reasonably good guesses. For one

THE GRANDMOTHER OF TYPEWRITERS



This crude machine, with a keyboard like a piano, was patented by Christopher L. Scholes in 1868. It was impractical, but various improvements made it efficient within five years.

guess, suppose we say that one night lightning set a tree afire, and one of our early ancestors used a blazing branch to light his way. Thereby he *discovered* the torch. We say he "discovered" it because he did nothing to bring the torch into being; he simply used what he saw. But now suppose that the torch went out, and this early man rubbed the burnt end into a sharp point. By doing that he *invented* the spear. We say he "invented" it instead of discovering it because he gave a new and useful shape to the burnt stick which the fire provided.

Inventions Made by Accident

In this case, not much thought or creative imagination was needed. Perhaps the man just rubbed the burnt end to a point for something to do, then threw his spear at a passing animal just as he might have thrown a stone. In such a case, his invention would have come largely from "tinkering" and by accident; and students of mankind's primitive days believe that most of the earliest inventions were made in just about this way. Many of them believe, for example, that agriculture was invented because some early people made a practise of scattering seeds on newly made graves to provide food for the departed souls. Somebody noticed that these seeds gave better yields than those which grew in the fields. Then this observant person tried scratching the ground with a stick or rude hoe before planting seeds and got a good crop. This would amount to inventing agriculture; and students of early man believe that most of the inventions which started men on the road toward material civilization were the result of experiences of this kind. Edged tools made of stone, pottery, spinning, and smelting ores to obtain metals probably got started

largely through accidental discovery, with only a little inventive thought and effort added.

Slow Progress in Ancient and Medieval Times

These inventions laid the foundations of civilized living, and the capstone of them was the invention of writing (*see* Writing). But the rate of invention was slow among primitive peoples living by rude agriculture and handicrafts. To succeed, an invention needs more than the ingenuity and imagination of a single individual. Others must recognize its value and use it. Many men may have to cooperate and expend considerable time and effort and wealth in order to develop and perfect the invention.

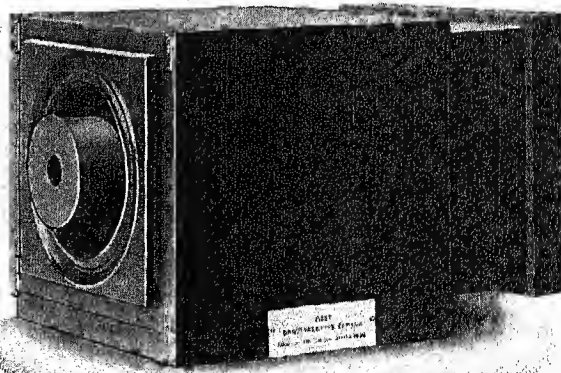
Even today these steps require time, and from ten to thirty years pass before a major invention such as the radio or automobile wins widespread adoption in fully developed form and usefulness. In ancient and medieval times the adoption and development of new ideas proceeded at a snail's pace, if at all. For one reason, nobody cared much about new ways. Most of the population was allowed to do nothing but work as peasants, slaves, or city craftsmen. The rulers and men of wealth were satisfied with life as it was; only rarely did they encourage or reward inventors.

Moreover, the men of these ages were interested most of all in problems of the mind and soul. They wanted to develop and spread their ideas about religion, government, and the arts. They cared little about making work easier or more productive.

Finally, to advance much beyond the rule-of-thumb levels, men need the help of sound scientific knowledge; and in ancient and early medieval times science was severely handicapped. Every people had myths, superstitions, and religious beliefs which attempted to explain everything in the universe. Any scientific discovery was almost certain to challenge one of these beliefs; and the discoverer might lose his life instead of being allowed to use his discovery.

As a result, inventions and discoveries came only in response to some rare urge or compelling need. The Sumerians developed the arch and other architec-

THE FIRST AMERICAN CAMERA



This camera was made in the United States in 1839, following principles which had been developed by Louis Daguerre in France. It was focused by sliding one open box inside another, and the exposure was made by taking a cap off the lens.

A GROUP OF FAMOUS AMERICAN INVENTORS AND INDUSTRIALISTS



This meeting of famous and ingenious Americans took place only in the imagination of the artist, John Sartain, who engraved it in 1862. The men and the inventions or processes for which they are remembered are: 1. Dr. W. T. G. Morton, surgical anesthesia with ether; 2. James Bogardus, structural iron work; 3. Samuel Colt, revolver; 4. Cyrus H. McCormick, reaper; 5. Joseph Saxton, deep-sea thermometer; 6. Peter Cooper, "Tom Thumb" locomotive; 7. Charles Goodyear, vulcanization of rubber; 8. Joseph Henry, development of electromagnet; 9. J. L. Mott, iron bridges; 10. Eliphalet Nott, heating devices; 11. John Ericsson, screw propeller, solar engine; 12. Frederick E. Sickles, steam cut-off; 13. Samuel F. B. Morse, electric telegraph; 14. Henry Burden, cultivator and horse-shoe machinery; 15. Richard M. Hoe, rotary printing press; 16. Erastus B. Bigelow, carpet loom; 17. I. Jennings, friction matches; 18. Thomas Blanchard, duplicating lathe and tack-making machinery; 19. Elias Howe, sewing machine.

tural forms in order to erect mountainous temples to their gods on the flat Mesopotamian plain. The Phoenicians developed seafaring, because therein lay their only chance to earn a good living (*see* Phoenicians). The Greeks developed architecture and seafaring, and also laid the foundations of modern art, literature, drama, abstract science, and education (*see* Greece); but otherwise progress consisted only of improving minor details of handiwork and perfecting known processes until after the First Crusade (*see* Crusades).

The Outburst of Modern Inventiveness

The Crusades stimulated a desire for new knowledge and new ways throughout Europe. As a result, both science and inventiveness received a new impetus, which has persisted down to our own day.

This third period in the history of invention begins with the introduction of the magnetic compass about 1200 A.D., of gunpowder, supposedly by Roger Bacon, about the same time, and of printing about 1450. These may have been invented in China long before, but the West discovered them independently, and used them to discover America and expand world horizons, to shatter the outworn feudal system of government, to make known the rediscovered science and art of the Greeks and the Romans, and to free men's minds. (*See* Compass; Feudalism; Gunpowder; Printing; Renaissance.) Since then, some of the great inventions are the first compound microscope by Zacharias Janssen (about 1590), the telescope by Lippershey (1608), the pendulum clock by Huygens (1657), a practical microscope by Leeuwenhoek (about 1680), an improved steam engine by Watt

(1769), spinning machinery by Hargreaves, Arkwright, and Crompton (1764-74), the power loom by Cartwright (1785), gas lighting by Murdock (1792), vaccination by Jenner (1796), the steamboat by Fulton (1807), the railway locomotive by Stephenson (1814), the reaping machine by McCormick (1831), photography by Niepce and Daguerre (1827 and 1839), the electric motor and dynamo by Faraday (1831), the telegraph by Morse (1837), the sewing machine by Howe and others (1846), the open-hearth steel process by Siemens-Martin (1867), the telephone by Bell (1876), the gas engine by Otto (1878), and the linotype by Mergenthaler (1885).

Other inventions that struck out new lines were the automobile, the submarine, the airplane, the application of chemical analysis to every branch of manufacturing, and the means of making exact measurements. The first decade of the 20th century saw the invention of the audion or vacuum tube, without which radio communication could never have been brought to its present degree of perfection.

Both the automobile and the steam locomotive were forecast in the brilliant but erratic work of an Englishman, Richard Trevithick (1771-1833), a genius who improved Watt's engine, and in 1800 built the first high-pressure non-condensing steam engine. In 1801 he built a steam carriage, the forerunner of the automobile. Characteristically, he lost interest in it when it worked successfully, and then built the first locomotive, which drew a heavy load at five miles per hour. He ignored this also and turned to other inventions, leaving the development of the locomotive to George Stephenson, a mine engineer.

Development of the steam carriage was halted in 1836, when England passed a law decreeing that a man must walk in front of the engine and wave a red flag to warn people on the road. The beginning of the automobile era dates from the invention of the internal combustion or gas engine (1878) and its adaptation to automobiles, although a Frenchman, Léon Serpollet (1858-1907) achieved success with a flash steam boiler which he invented in 1888. A great help was the pneumatic rubber tire, which was patented in 1888 by an Irish veterinarian, John Boyd Dunlop of Belfast (1840-1921). (See Automobile.)

The automobile put the petroleum industry on a new basis. Instead of refining the oil merely for lighting and heating fluids, the producers concentrated on securing gasoline, and "cracking" processes were developed. The increased demand for petroleum and its by-products also brought about improved methods of transportation. From the first successfully operated pipe line in the United States, a four-mile tube laid in 1865, there has grown a complex system of thousands of miles of pipe. (See Petroleum.)

Another development has been the Diesel engine, which uses fuel oil. It was invented in 1892 by a German engineer, Rudolf Diesel (1858-1913). (See Gas Engine.)

Modern wonders of electricity may be traced to the theory advanced in 1873 by James Clerk-Maxwell (1831-1879), an English physicist, that radiation had electromagnetic qualities. Clerk-Maxwell declared that there were invisible electromagnetic waves which had much the same properties as light. (See Radiation.) A young German professor, Heinrich Hertz (1857-1894), who had been a pupil of the great Helmholtz (1821-1894), confirmed Clerk-Maxwell's theory by generating the waves in his laboratory. Hertz did not realize that these new impulses, or Hertzian waves, might be used to transmit messages. But Marconi saw the possibility, and in 1896 he improved upon Hertz's sender and patented the instrument, immediately beginning his work with wireless telegraphy. A year later he sent signals four miles. (See Electricity; Radio.)

Two Serbian immigrants to the United States, Michael Pupin and Nikola Tesla, greatly advanced the development of wireless. The former became a

professor in the engineering department of Columbia University after working his way through school and college under staggering hardships. He discovered the tuning principle for the wireless, and invented the loading coil for the telephone. Tesla, who began his work in Grätz, Austria, came to America in 1884. He invented an induction motor and a system of alternating current, and developed the transmission of power by wireless. He harnessed the water power of Niagara, and the principle of his Tesla oscillation trans-

former is used in radio broadcasting transmitters and receivers.

Henri Moissan (1852-1907), French chemist and winner of the Nobel prize for chemistry in 1906, experimented with the heat-generating power of electricity, and invented the electric furnace, which immediately became a valuable device for metallurgists.

A pioneer in the effort to make light from electricity was Sir Joseph Wilson Swan (1828-1914), an English physicist who invented an electric lamp in 1860, using much the same procedure

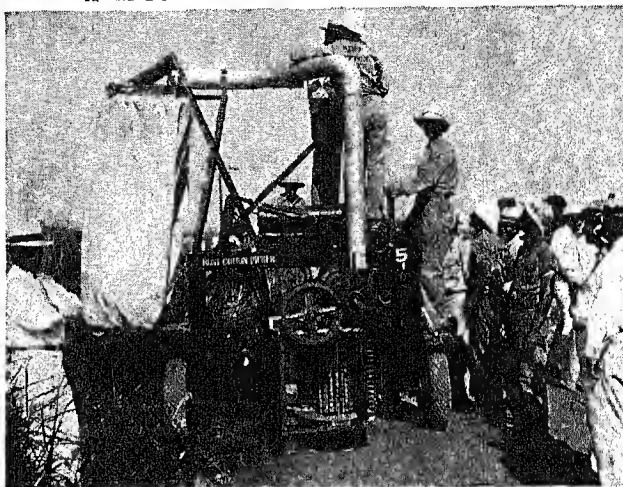
that Thomas Edison used in 1879. Swan, like Edison, was not satisfied with the carbon filament and in his experiments to improve it he invented the squirting process now used in the manufacture of rayon. Swan squirted collodion into a solution which thickened it into sturdy threads, then he carbonized the threads by applying intense heat.

While electricity was capturing the imagination of the scientists, a young English surgeon, Joseph Lister (1827-1912) was formulating the principle of antiseptic surgery. By using germ-killing acid solutions on his instruments and hands, Lister (later Lord Lister) inaugurated a new era in surgical procedure, bringing the attention of the scientific world in 1867 to the value of antiseptics in combating infection.

In the field of practical mechanics, Sir Marc Isambard Brunel (1769-1849) contributed the shield which enabled men to tunnel under water and water-bearing ground. The shield was improved by James Henry Greathead (1844-1896), an English engineer, who developed the cylinder shield into a large tube equipped with air-tight doors. (See Tunnels and Subways.)

James Nasmyth (1808-1890) is credited with revolutionizing the construction of foundations, docks, and wharves, as well as drop forging, by his invention

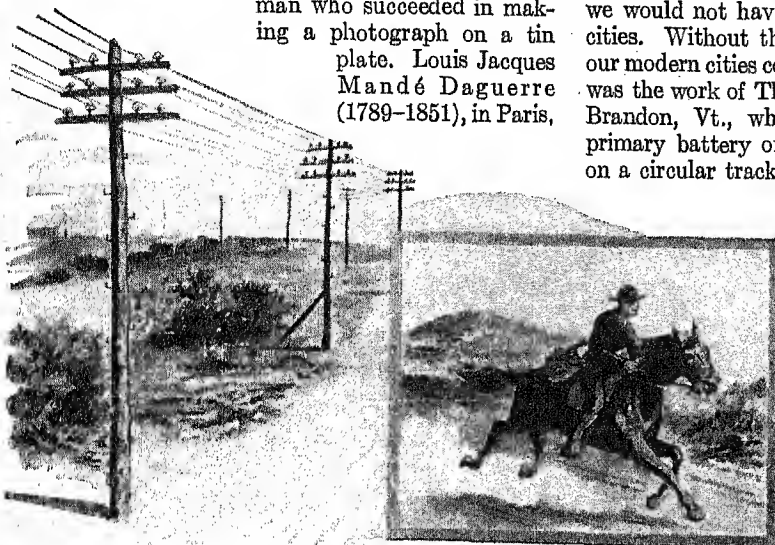
A MACHINE THAT PICKS COTTON



This shows a rear view of the cotton picker invented by John and Mack Rust of Weatherford, Tex. As it moves forward, a row of cotton plants passes under that arch just inside the left wheels. Slender spindles comb through the plants, and because the spindles are kept wet, the cotton fibers cling to them.

of the steam hammer in 1839. Among his other inventions were a hydraulic punch, safety ladles for foundries, and the wedge-shaped water valve.

In 1827 the art of photography was invented by Joseph Nicéphore Niepce (1765-1833), a studious French countryman who succeeded in making a photograph on a tin plate. Louis Jacques Mandé Daguerre (1789-1851), in Paris,



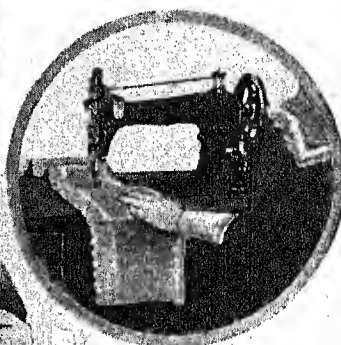
was then experimenting on the same subject, and in 1829 he formed a partnership with Niepce. (See Photography.) Photo-telegraphy, or the sending of pictures by wire, was successfully tried in 1904 by Prof. Arthur

Korn of Germany, who based his method on the fact that the electrical conductivity of selenium varies with the amount of light that falls upon it (see Selenium). Television, relatively old in theory but recent in practical development, was successfully demonstrated in both the United States and England as early as 1925 and is developing rapidly (see Television and Telephotography).

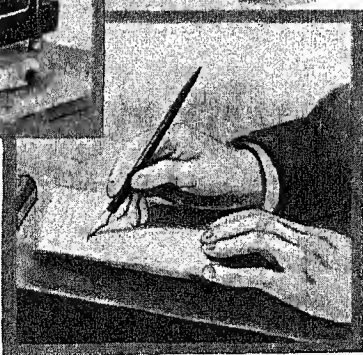
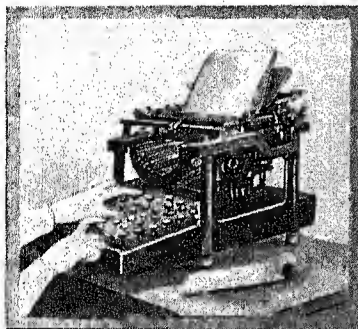
Although sound and talking pictures came upon the cinema world with a sudden surprise in 1926, the idea was not new to scientists, since there had been many previous experiments in synchronizing phonograph records with motion pictures. The commercial development of color photography is credited to Dr. Herbert T. Kalmus (born 1881).

Of high economic value among modern inventions has been the manufacture of nitrates from atmospheric nitrogen, developed largely by Sir William Crookes (1832-1919), an English chemist (see Nitrogen.)

The tremendous effect of many inventions on modern life can easily be appreciated. But for the elevator we would not have the towering skyscrapers of our cities. Without the electric car and the motor bus, our modern cities could not exist. The first trolley car was the work of Thomas Davenport, a blacksmith of Brandon, Vt., who mounted a toy motor and a primary battery on a small vehicle and operated it on a circular track. The first elevator was designed by Henry Waterman in New York (1850), but about the same time, in Boston, George H. Fox & Company were build-



Here are three of the changes invention made in civilized life in the 19th century alone. The post horse gave way to the telegraph; the sewing machine did away with much of the tedious hand sewing; while the typewriter began to do the bulk of the civilized world's writing.



ing the same type of elevator. Elisha G. Otis began making elevators in 1852.

The Industrial Revolution is dramatic proof that inventions may alter the economic and social balance of a nation and ultimately of the entire world (see Industrial Revolution). When the Rust brothers demonstrated their mechanical cotton picker in 1935-36, the first question that arose

was the possible effect of this invention on the thousands who made their living picking cotton by hand.

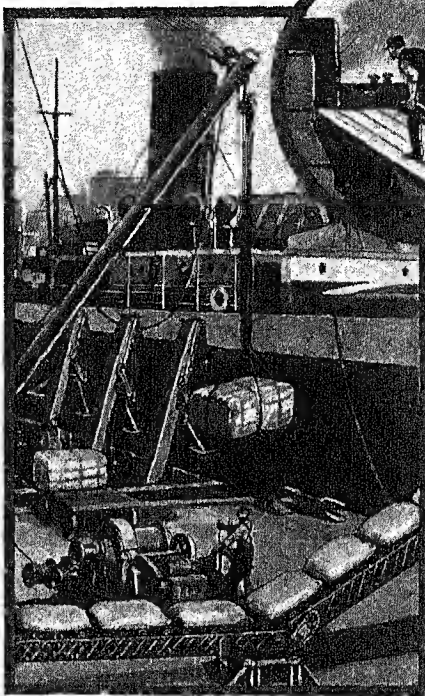
Old-time inventors usually worked alone. Organized research, with many men working together on the same inventions, is a modern development. Its value was proved when German chemists built up a monopoly of the dye industry by working on the discovery of the Englishman, Sir William Henry Perkin, that a mauve

coloring could be secured from coal-tar. Now research laboratories are an essential department of all great industries; and many small industries are banded together to support similar laboratories for their special fields.

Museums in England, Germany, and the United States display machines and other inventions that have transformed the industries of the world. Models of these inventions are shown in actual operation at the Science Museum of South Kensington in London, the *Deutsches Museum* in Munich, the *Technisches Museum für Industrie und Gewerbe* in Vienna, and the Museum of Science and Industry, founded by Julius Rosenwald, in Chicago. This museum has been planned on a larger scale than any of the others. It is housed in the remodeled Fine Arts Building of the World's Columbian Exposition of 1893, in Jackson Park, and it has room for several miles of exhibits. These are continually changed or enlarged to keep pace with the newest inventions. A model coalmine, complete in every detail, is typical of the exhibits which show the workings of inventions in modern industries. Guides and lecturers are employed to help visitors operate machinery and to explain its principles. Reading rooms, one for children and another for adults, enable visitors to pursue further those interests awakened by a tour of the museum.

I'o. This beautiful maiden, the daughter of Inachus, king of Argos, as the story is told in Greek mythology, was beloved by Zeus (Jupiter). To protect the maiden from the jealousy of Hera his wife, Zeus changed Io into a white heifer. But Hera was not deceived and appointed the giant Argus, "the all-seeing one," who had a hundred eyes, to watch over her. Hermes (Mercury), the winged god, commissioned by Zeus to carry off the heifer, slew Argus, first charming him to sleep by playing on the flute and then cutting off his head. Hera used the eyes of Argus to decorate the tail of the peacock, her sacred bird. But the jealous goddess, not yet satisfied, sent a gadfly to torment Io, who fled over land and sea, without a moment's rest, until finally she was restored to human form.

MAKING TOIL EASIER



Once human labor was the cheapest thing there was, and no effort was made to conserve it. But now invention bends all its resources toward reducing the necessity for manual toil, as in the case of the machinery which you see here, replacing the stevedore, with his truck.

IODINE. The drug iodine and its many compounds are used in the internal treatment of rheumatism, pleurisy, Bright's disease, asthma, bronchitis, goiter, and in chronic lead and mercury poisoning. Iodine is used in many forms as a disinfectant and antiseptic, and, as a counter-irritant, it relieves pain and congestion. Iodoform, which produces the unpleasant sweetish odor encountered in hospitals, is a compound of carbon, hydrogen, and iodine used as an antiseptic in surgical dressings.

Iodine is the essential constituent of thyroxin, the active principle of the thyroid gland, and a lack of iodine tends to promote goiter. Iodine occurs in seaweed, sea water, fish, and in the air about salt water. There is little goiter near sea-coasts or among people who eat considerable sea food. In inland regions, however, such as Switzerland and the Great Lakes

regions of the United States, goiter is endemic—that is, it is always present. Iodized salt, which is common table salt with a trace of alkaline iodide, is prescribed as a preventive of goiter; in parts of Switzerland the law demands that all salt be treated with iodine.

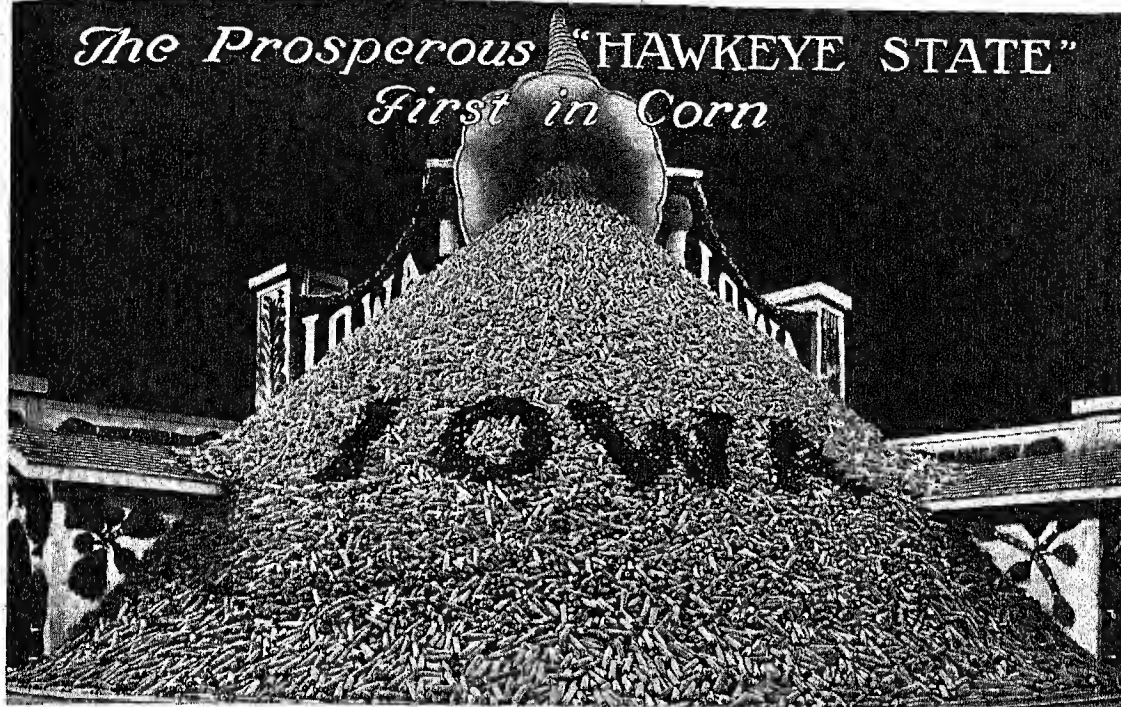
Most of the world's iodine comes as a by-product from the nitrate beds of Chile. The "air-nitrates"—synthetic nitrates—are deficient in iodine, and their use in fertilizers has brought an increase in goiter in both men and animals. As a remedy, producers of synthetic nitrate urge that more fish be used as food for both humans and animals and be added to fertilizers, since sea foods contain from 50 to 200 times as much iodine as other foods.

Commercial quantities of iodine are secured from seaweed in France, Scotland, Norway, Japan, and Java. No iodine was produced in the United States until recently; now it is recovered in California from waste oil field brines.

Iodine is known in chemistry as one of the four halogens, the others being chlorine, bromine, and fluorine. Its chief compounds, called iodides, are formed with various metals. Pure iodine is a crystalline substance which turns to heavy purple vapor when heated to 184° F. Iodine is used extensively in chemical analysis, particularly in volumetric procedure.

It was discovered in 1811 by Bernard Courtois, of Paris, who was treating seaweed to get saltpeter for the manufacture of gunpowder for Napoleon's army. The antidote for iodine poisoning is starch water.

The Prosperous "HAWKEYE STATE" First in Corn



This display is a symbol of Iowa's riches. Corn—a veritable golden flood of it—is the cornerstones of the state's wealth.

IOWA. People the world over know Iowa as one of the earth's great farming regions. Out of every hundred acres in the state, 95 are in farms. Of these, 75 are suitable for crops and 62 are actually cultivated. Compare these figures with those for the United States as a whole, where only 50 out of a hundred acres are in farms, only 25 are available for crops, and only 18 are actually cultivated. Of all the soil in the United States classed as Grade A, or "excellent," Iowa contains one-fourth.

The climate and soil of Iowa are particularly suited to growing corn, and it produces one-fifth of the nation's crop. Where corn grows, hogs and cattle fatten, and Iowa raises more hogs and grain-fed beef than any other state. It leads also in poultry and egg production.

With the yield of their farms, the people of Iowa have created for themselves a high and well-distributed scale of living. Wealth and industries are not concentrated in one or two great centers. Only one city, Des Moines, has more than 100,000 population. But cities of medium size have grown up in all parts of the state, each with its own industrial independence founded on the resources and needs of the surrounding area. Iowa is 24th among the states in area, 20th in population.

Uncle Sam has made few investments which have repaid him more richly than has Iowa. The 56,280

Extent.—East to west, 310 miles; north to south, 210 miles. Area, 56,280 square miles. Population (1940 census), 2,538,266.

Natural Features.—Rolling prairie country. Chief rivers: Mississippi, Des Moines, Iowa, Cedar, Missouri, Big Sioux. Mean annual temperature, 48°; mean annual precipitation, 32".

Products.—Corn, hay, oats, potatoes, live stock, poultry; coal, cement, stone, clay; meat, butter, corn products, flour.

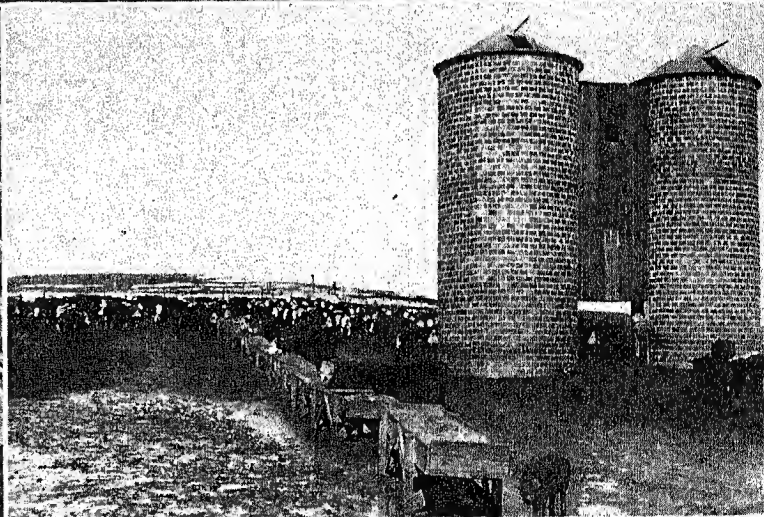
Cities.—Des Moines (capital, 159,819), Sioux City (82,364), Davenport (66,039), Cedar Rapids (62,120), Waterloo (51,743), Dubuque (43,892), Council Bluffs (41,439).

square miles which comprise the state's area constitute a comparatively small portion of the Louisiana Purchase of approximately 1,000,000 square miles,

acquired from France at a cost of about \$15,000,000. Let us say the United States paid Napoleon \$1,000,000 for Iowa. Every year Iowa farmers get three times as much as that for their colts. It is only a fraction of the value of the eggs in Iowa nests each year, for every month the Iowa hen more than pays Iowa's original cost. Whether farm lands are priced high or low, depending on conditions, the rich acres of Iowa are always quoted at the highest price in the country. The value of the diversified products of these lands mounts into many hundreds of millions annually. Iowa as a state is not old; it has been in the Union since 1846. Yet with one year's farm income it could build two Panama Canals; and the value of the corn crop alone is greater than the total national income of some European states.

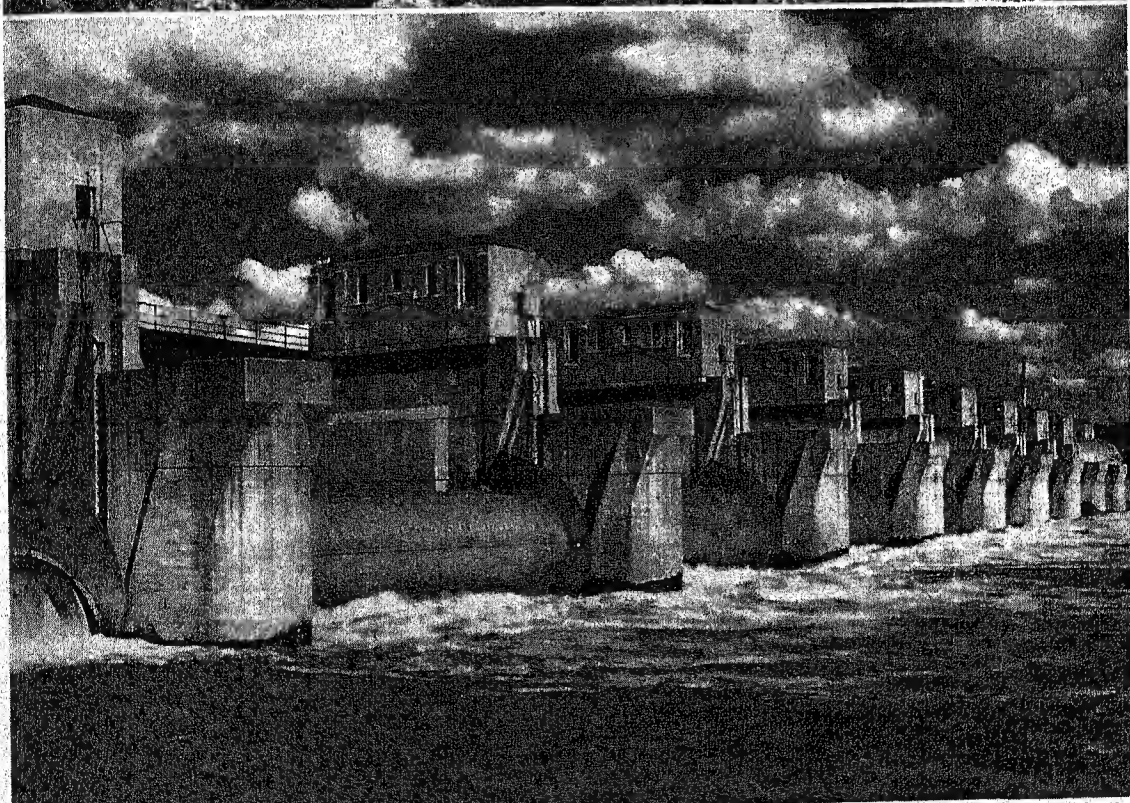
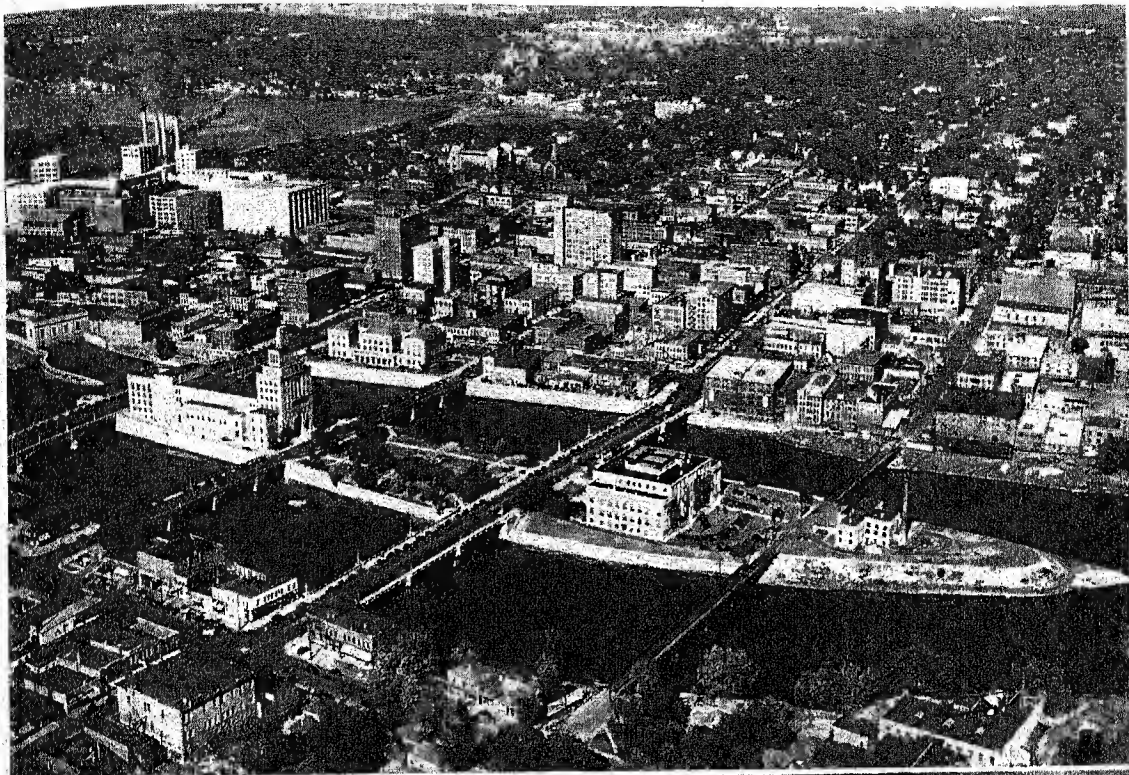
The hardy men and women, of the pure-bred American stock, who crossed the Allegheny and Blue Ridge mountains after the War of 1812, began the settlement of Iowa in the years following 1825. They had become interested in Iowa through information concerning the limitless fertility and excellence of its soil brought back by Col. Zebulon M. Pike, who had made a historic journey to the sources of the Mississippi River a few years previously. Fort

WHY IOWA'S FARMERS ARE PROSPEROUS



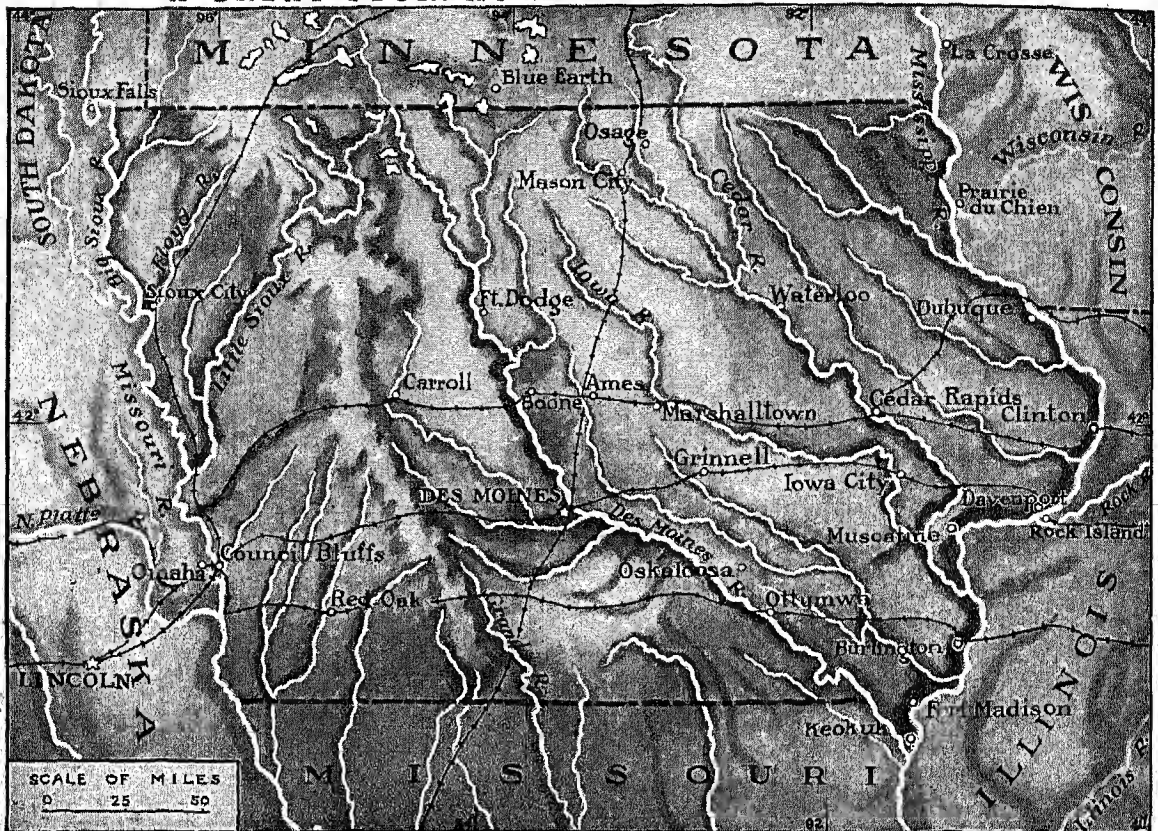
Corn, hogs, cattle, poultry—these are the big four of Iowa's farms. Look closely at the top picture and see if you can find the evidence that all four are raised on this typical Iowa farm. It is the tremendous crop of corn (left center) that makes this state first in hogs, first in grain-fed beef, and first in poultry. The pictures of hogs and Hereford cattle were taken in the western meat-producing area.

A STATE OF GROWING INDUSTRIES



At the top is an airplane view of the heart of Cedar Rapids, one of Iowa's chief industrial centers. It shows Municipal Island in the Cedar River which cuts through the southwestern section of the city. Below is a view of the government dam and locks across the Mississippi River at Davenport. The building of this dam removed the difficulties of river navigation above the city and created Lake Davenport, covering 6,000 acres. (Top photograph on this and preceding page ©Fairchild Aerial Surveys, Inc.)

A GREAT STOREHOUSE OF NATURE'S BOUNTY

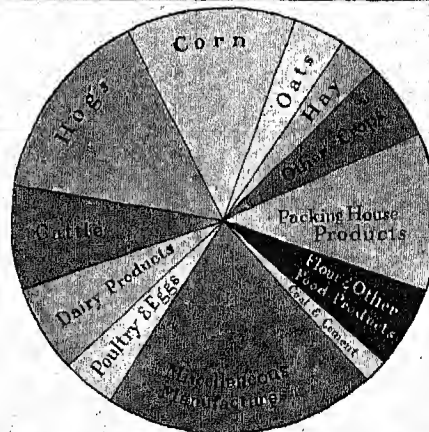


Madison, scene of much fighting in the Black Hawk War of 1832, was one of the first towns founded. Burlington and Dubuque likewise were settled early. Until recent years the increase in Iowa's population was exceptionally rapid. Iowa's wonderful farm lands are nearly all developed, about 29,000,000 of the state's 35,000,000 acres being under cultivation. Iowa has only 11 cities with more than 25,000 inhabitants, and the urban population is increasing but slowly; 57.3 per cent of the people still live on farms.

Iowa's educational system is one of the finest in the country; and the state's percentage of illiteracy is the lowest, being only 0.8 per cent, less than one-fifth of the 4.3 per cent average of the United States. The chief institutions of higher learning are the State University at Iowa City, the State Teachers College at Cedar Falls, and the State College of Agriculture and Mechanic Arts at Ames.

Iowa is preeminently the state of the "little red schoolhouse," since there are nearly 12,000 separate school buildings scattered through the commonwealth, thousands of them in rural communities and hamlets.

Although the romance of Iowa's meteoric growth as a center of agricultural wealth is the outstanding feature of her development, her people have made



Lying between the Missouri and the Mississippi rivers, Iowa's rich black soil is watered by the countless tributaries of these great streams, as you can see on the map above. Below, the industries are compared and the division of the population according to occupations is shown.

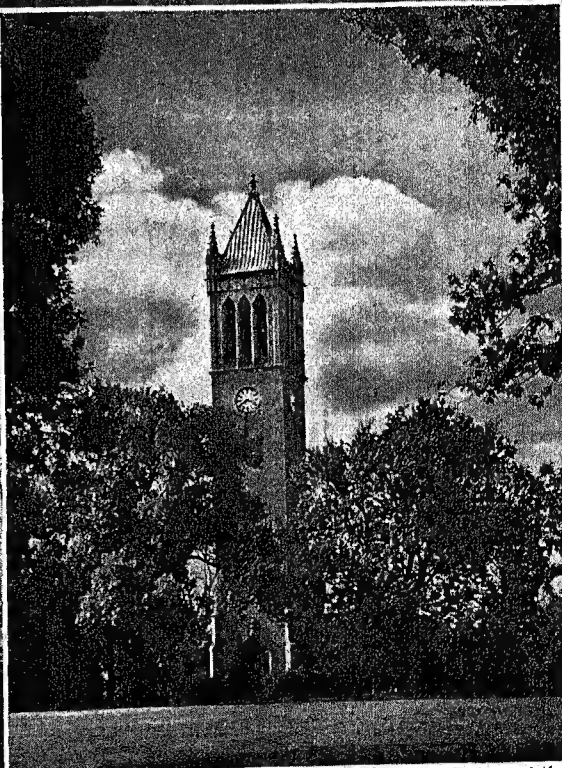
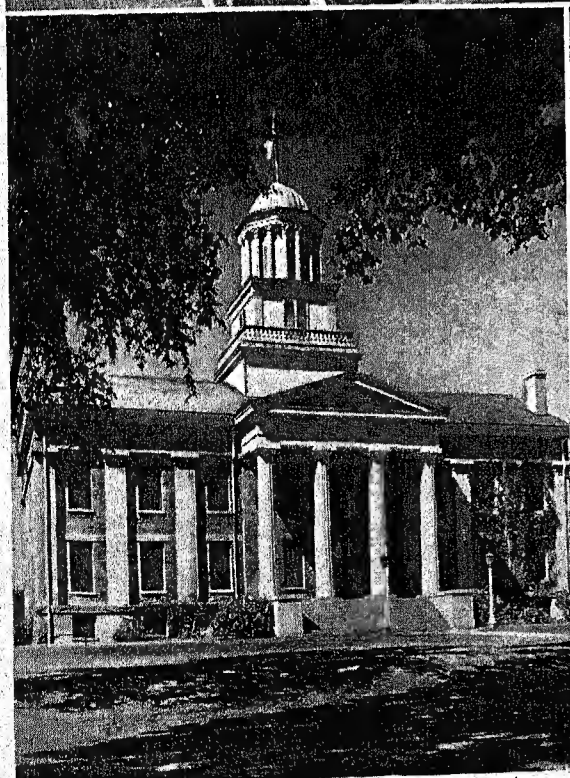
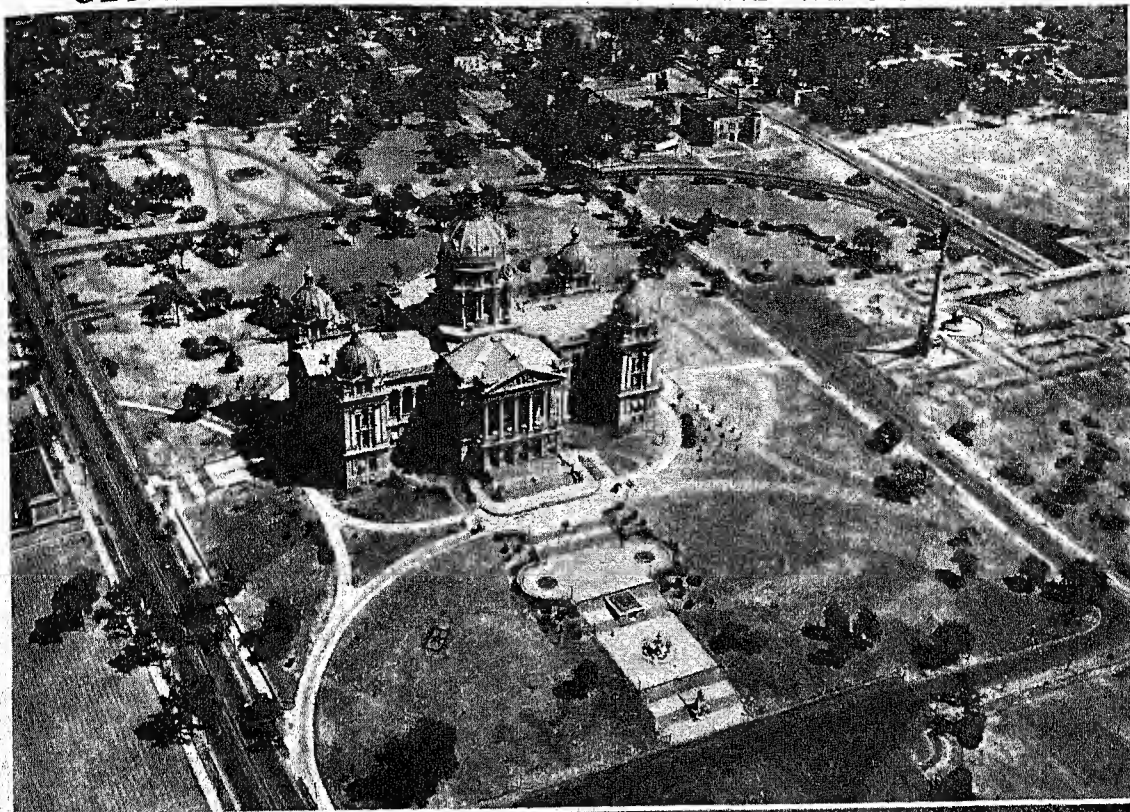
AGRICULTURE

MANUFACTURING

OTHER
OCCUPATIONS

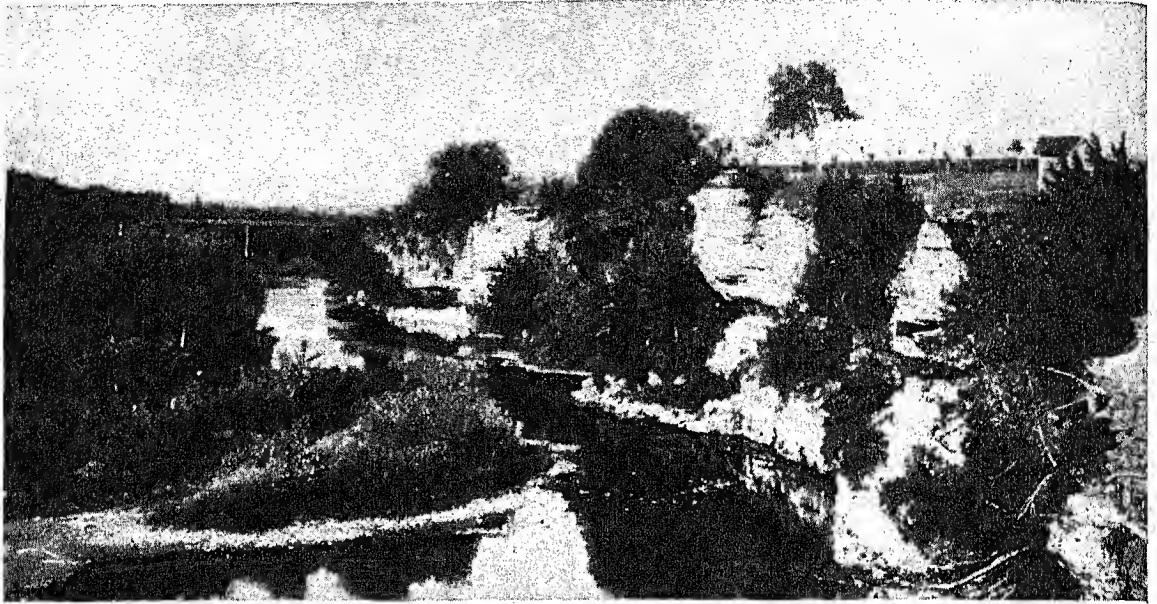
considerable strides in industry in recent decades. This has been made possible largely through the development of the large deposits of bituminous coal in the central part of the state. Another factor which is now contributing enormously to Iowa's industrial expansion is the famous Keokuk dam across the Mississippi River at Keokuk. This dam,

CENTERS OF GOVERNMENT AND EDUCATION



On a hill in the eastern section of the city of Des Moines towers the imposing State Capitol shown in the top picture. Below, at the left is the old State Capitol at Iowa City, now used as the administration building of the University of Iowa. At the right stands the graceful campanile or bell tower of Iowa State College at Ames. (Top photograph © Fairchild Aerial Surveys, Inc.)

A BIT OF PICTURESQUE SCENERY ALONG THE IOWA RIVER



The Iowa River, which flows southeastward across the state, has cut this small gorge through the limestone underlying the Iowa plain, leaving a jagged and picturesque formation, overhanging the peaceful waters. Here trees and bushes have taken root, producing a scene which is typical of most of the river valleys of the state. On the gently sloping land above are situated the fertile farms.

one of the longest in the world, was completed in 1913 by a private water-power company, and is regarded as a remarkable engineering feat. The dam, nearly a mile long with works stretching $1\frac{1}{2}$ miles, develops 120,000 horse-power in its score or more of turbine generators. It supplies electric current to St. Louis, 145 miles away, and also to many smaller cities. By means of a lock steamboats are raised 40 feet to the level of the river above the dam.

Many Industries of the "Hawkeyes"

Meats, butter and cheese, flour and grist mill products, lumber and timber products, foundry and machine shop products, and farm implements are among Iowa's principal manufactures.

A picturesque industry, and one which is attaining much commercial importance, is that of fishing for mussel shells for the manufacture of pearl buttons. At night one may catch a glimpse of the lonely mussel fisherman in his flat-bottomed scow, dragging the river's bottom by the dim light of the moon. Millions of mussels have been hauled up from the muddy depths of the Mississippi to be fashioned into pearl buttons, and not a few fortunes have been made by mussel fishermen lucky enough to find valuable fresh-water pearls in their catches. Some of these pearls are nearly flawless and bring large sums. The course of the Mississippi abounds in button factories, an industry which has sprung up only in recent years to utilize the supply of mussels.

Like all regions situated in the midst of a vast inland territory the climate is typically continental in extremes of heat and cold. Government records for 26 years show a maximum range of 160 degrees, from 113 degrees above zero to 47 degrees below. The

annual precipitation is well apportioned to bring the best results for crops, with 80 per cent of the rainfall coming during the crop-raising months from April to October.

The name Iowa is derived from an old Indian word signifying "sleepy waters," and was first applied to the Iowa River. The state received its nickname, the "Hawkeye State," in the halcyon days of the Burlington *Hawkeye*, one of the famous newspapers in the early history of American journalism.

The French explorers Marquette, Joliet, and Hennepin touched the borders of the state in the latter part of the 17th century. A hundred years later (1788) Julien Dubuque obtained from the Indians the present site of Dubuque and established a trading post and lead mine there, but this enterprise was abandoned in 1810.

Iowa's Progressive State Policies

Probably in no way is the alert progressiveness of Iowans and their wideawake receptiveness to new ideas better shown than in the political history of the state. As far back as before the Civil War, Iowa was one of the first and most enthusiastic states to champion the cause of the abolition of slavery, and more than 75,000 of its men, one-tenth of the population, fought for the North. Iowa was one of the first states to enact a prohibition law, in 1834, and Des Moines was the first important city in the country to adopt the commission form of government. Iowa also was a pioneer among the states in adopting direct primaries, having passed such a statute in 1907.

The broad prairies of Iowa are traversed by about 10,000 miles of railroads—only three states have more—and a fine system of surfaced highways.

IRAQ (*Irak'*). That cradle of civilization, the wide alluvial plain between the shifting beds of the Tigris and Euphrates, which for uncounted centuries has watched peoples and cities rise to power and sink again into its sifting dust, is once more nursing an infant nation. This is Iraq, an Arab country, formed from the land of ancient Mesopotamia, wrested in the first World War from the rule of the Turk.

A strip of mountains and foothills and narrow green valleys borders Iraq on the north and northeast, near the boundaries of Turkey and Persia. The greater part of the country, however, is a drear monotony of flat desert and barren rolling steppes, relieved only by a fringe of green along the twisting banks of the two great rivers that unite to form the sluggish Shatt-el-Arab emptying into the Persian Gulf at the southeast (see Euphrates River; Tigris River). The silt of the two rivers has built a long alluvial plain and delta so fertile and fair to desert eyes that here legends locate the Garden of Eden and one of the Moslems' four earthly paradises. On the west, Iraq's sands merge with those of the Syrian and Arabian deserts.

Centuries of war and the shifting of the river beds have destroyed the irrigation systems which made the fertile plain the seat of scores of cities now long crumbled into ruins (see Mesopotamia). But the government has undertaken large irrigation projects, and about 4,000 square miles of land now produce fine crops. Iraq supplies nearly all the dates imported into the United States. It also exports barley, wheat, and other cereals; wool and cotton; sheep and goat skins, horses, and camels.

The Mosul oil fields, far up the Tigris, are a chief source of revenue. The Mosul region, claimed by Turkey after the World War, was given to Iraq by the League of Nations in 1926. Oil began to flow in 1934 to the Mediterranean through two pipe lines. These lines run side by side across the Tigris and Euphrates rivers and then separate, one going to Haifa in Palestine, and the other to Tripoli in Syria. Near Hit, on the Euphrates, are asphalt deposits.

The Arabs make up more than 90 per cent of the population. They are about equally divided between the Sunnite and Shiite sects of Mohammedanism. Karbala, Najaf, and Samarra are noted pilgrim centers. Strange religions are those of the Yezidis, devil worshippers, and of the Sabians, star worshippers, who must always

live in river towns because their ritual calls for running water.

In Baghdad, the capital (see Baghdad), summer heat, often 122° F., drives the people to the *serdab*, a cellar with a ventilating shaft, whose opening is turned to catch every breath of the northwest wind. On summer nights, people seek the roof for comfort, and find the shabby old city transformed as moonlight bathes spires and domes. In winter, sharp cold penetrates the fluttering rags of street beggars.

Far down on the Shatt-el-Arab is the date-palm city of Basra, legendary port of Sinbad. Here in September the "date wind," with its steaming breath of the Gulf, ripens the crop. Since 1938 Iran (Persia) has shared the harbor, which is crowded with oil tankers and native craft that transfer cargoes to ocean vessels.

Basra and Baghdad are on airplane routes that link Europe and Asia. They are also on the history-making

railway, completed in 1940, which extends the length of the country and connects it with Turkey and Europe. Many motor roads have been built recently.

Among the ruins of the old irrigation canals on the lower river live the swamp Arabs in their reed huts. Safe in tiny hamlets on islands between the twisting channels which they alone know, they were never conquered by the Turks. They claim descent

from the first historic dwellers of the plain, the Sumerians, and believe that the swamp waters are the remains of the great flood of biblical times.

The swamp Arabs, the city dwellers, and the farmers all are scorned by the desert Arab, who cherishes the fierce freedom of nomad life and defies the law. His only allegiance is to his tribe.

Great Britain was given a mandate for the new nation of Iraq in 1920. Faisal, an able Arab ruler, was made king in 1921. In 1930, a 25-year treaty of alliance with Britain was signed, providing for Iraq's independence after it had joined the League of Nations and allowing Britain to keep military forces at certain points. On the death of Faisal in 1933, Prince Ghazi became king. Upon his death in 1939, he was succeeded by his three-year-old son, Faisal II, under a regency. In 1941, following seizure of power by pro-German natives, British forces occupied the country and re-established the old order, to safeguard Iraq's vital supplies of oil. Area estimated at 116,000 square miles; population, about 3,560,000.

WHERE THE FAITHFUL OF BAGHDAD PRAY



The Kadhimain Mosque with its four minarets is set in a welter of flat-roofed houses built about courtyards, typical of Arab cities.



The Smiling Sister Island of Great Britain—Its Early Civilization and Conversion to Christianity—How Ireland was Conquered and Oppressed by the English Kings—The Long Struggle for Self-Government—The Irish Free State

IRELAND. A romantic history, scenic beauty, the charm of a warm-hearted and impulsive people, numerous ties of blood and sympathy, and political problems of world interest give to Ireland an importance out of all proportion to its 32,000 square miles of area—about the size of the State of Maine. It is separated from its sister island of Great Britain by only 13 miles of water towards the north and 47 miles in the south, and its fortunes have been inextricably entangled for more than 1,500 years with those of its Anglo-Saxon neighbor.

In surface Ireland is an inland plain, surrounded by a rim of low mountains. The climate is much like that of England, mild and temperate, but the winters are even warmer, and there is more rain. There are numerous rivers, of which the Boyne and Liffey in the east, the Barrow and Blackwater in the south, and the Shannon in the west are most important. Lough Neagh is the largest of the lakes, and the Lakes of Killarney in the south the most beautiful.

Most of the people are of Celtic stock, which reached Ireland before the Christian era. In Northern Ireland (Ulster), which is a part of the United Kingdom and is largely populated by descendants of English and Scottish settlers, the prevailing religion is Protestant. The rest of the island, which is an independent state (called the Irish Free State from 1922 to 1938, now "Ireland" in English and "Éire" in Gaelic) is overwhelmingly Roman Catholic.

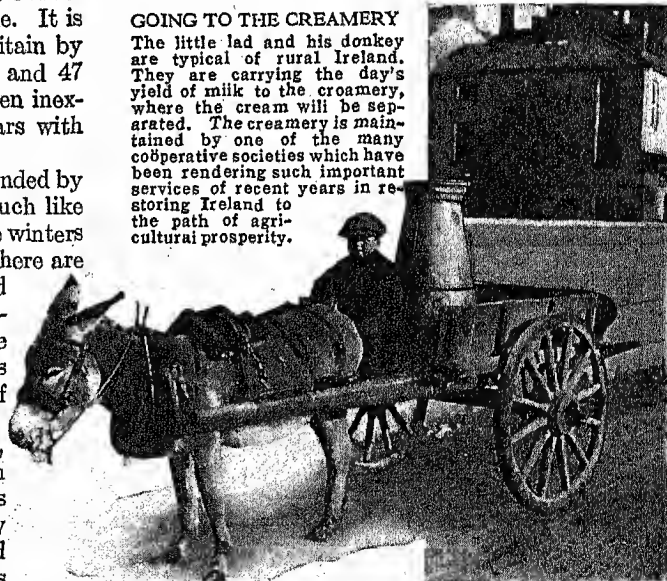
Historic antagonisms and economic differences intensify the cleavage between the two divisions of the island. The Ulstermen are for the most part practical men of business, whose trade and manufactures have

enriched their part of the country. They are accustomed of old to hold most of the political positions and to play the part of a ruling class. The south, on the other hand, is made up of a Catholic peasantry who, perhaps because they have long been overtaxed renters, are less progressive than their neighbors to the north. They cherish old traditions and old grievances; but they are essentially a kindly, generous, and talented people, with a wealth of imagination and poetry in their make-up.

Most of the land in Ireland is now owned in small holdings, averaging about 28 acres each. Only a comparatively small percentage of the soil is suitable for crop raising. The central plain is covered with bogs, the higher portion is largely moorland, and elsewhere much of the soil is thin. But this same soil,

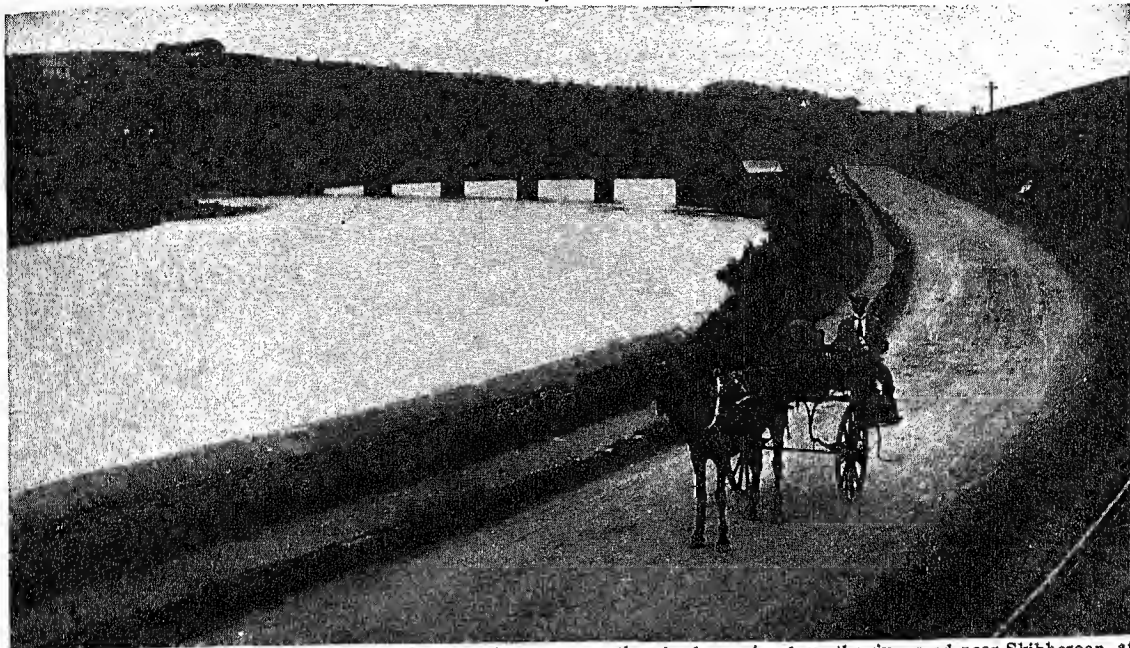
GOING TO THE CREAMERY

The little lad and his donkey are typical of rural Ireland. They are carrying the day's yield of milk to the creamery, where the cream will be separated. The creamery is maintained by one of the many cooperative societies which have been rendering such important services of recent years in restoring Ireland to the path of agricultural prosperity.



watered by heavy rains, grows grass unrivaled for grazing. The "Emerald Isle," so called from its wealth of vegetation, is therefore a natural dairying and live stock country. Encouraged by the Free State government, however, the farmers have used some of their pasture land for crops. Wheat, oats, and sugar beets are now grown, in addition to potatoes, which have long been the staple food of the peasantry. There

BITS OF IRELAND, NORTH AND SOUTH

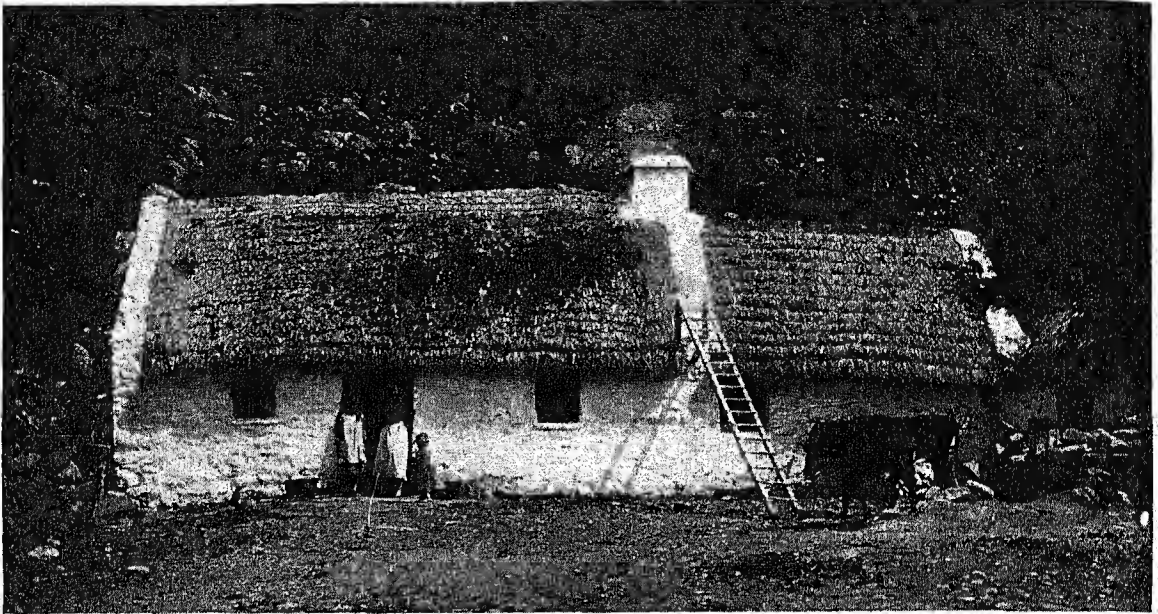


Here is one of the famous Irish jaunting cars, with its side seats over the wheels, coming down the river road near Skibbereen, at the extreme southwest point of Ireland. As you can see from the smiling country-side and the stone bridge, this part of Ireland deserves its reputation for picturesque beauty.



This view shows a bit of the Giant's Causeway, on the north coast of Ireland. The boy is sitting in what is known as the "Wishing Seat," and tradition says that a wish made while sitting there will come true. Notice the remarkable structure of the rocks which make up the causeway. They are six-sided columns of basalt, set close together exactly like a pack of lead pencils.

A PEASANT FARMER'S COTTAGE ON THE "OLD SOD"



The Irish countryside is dotted with thatched cottages of rough stone like this one. Their white walls stand out sharply against the green of the fields and the gray of the rocky hills. In one end dwells the farmer with his family and in the other the pigs are sometimes quartered.

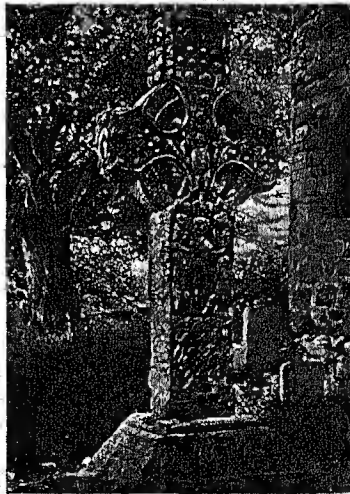
is almost no iron or coal, and there was no water power development until the Free State, in 1925-29, built huge hydroelectric plants on the Shannon River. Yet, without minerals or electricity, Belfast in the north has developed great linen and ship-building industries.

Ireland has neither the agricultural nor the mineral resources to support a large population. This has been the country's basic economic trouble. The peasant has lived close to the margin of existence and until recently has never hoped that he could be much better off. He had to rent from one of the large landholders, who often lived in England and were interested only in getting as much profit as possible from their estates.

The history of Ireland is a history of conquest and oppression by the English. Englishmen would be the first to say that Ireland is the worst blot on their record. The early history of Ireland before the English migration is a time to which the Irish love to look back. While the Saxon invaders of the larger island were still barbarians, Ireland for a time possessed one of the most advanced civilizations in western Europe. This was the time of St. Patrick (died 461 A.D.) and of a flourishing Irish Celtic Christianity. Henry II, one of England's great kings, conquered the Irish in the latter part of the 12th century. But only the

eastern part of the island was much affected by English institutions, or for centuries adopted the English language. The rest of Ireland was long given over to clans who warred with one another and with the

THE CROSS OF KELLS



This is one of the famous ancient crosses set up by the early Irish Christians. It is at the market town of Kells, forty miles northwest of Dublin.

English. Irish customs even invaded the "English Pale" about Dublin, and within a few generations English settlers within the "Pale" tended to become Irish in outlook and sympathy. The religious Reformation, which left Ireland unchanged in its Catholic faith while England broke with the Pope and set up a national church, still further widened the breach.

The Tudor sovereigns began in the 16th century the policy of enlarging English influence by settling large "plantations" of English and Scots in Ireland, dispossessing the Irish tribesmen from their land and driving them into the west. Further dispossessions went on under the first Stuarts, and whole tracts of north Ireland were taken from a desperate peasantry, to be given to Scottish intruders. Then, when

Charles I of England had his hands full with the mutinous Long Parliament, Ireland rebelled and put to death thousands of Protestant settlers (1641). Oliver Cromwell reconquered the country and with such rigor that his name remains a byword there. More land was taken from the peasants to be distributed among the English.

IN THE HEART OF DUBLIN, IRELAND'S LARGEST CITY

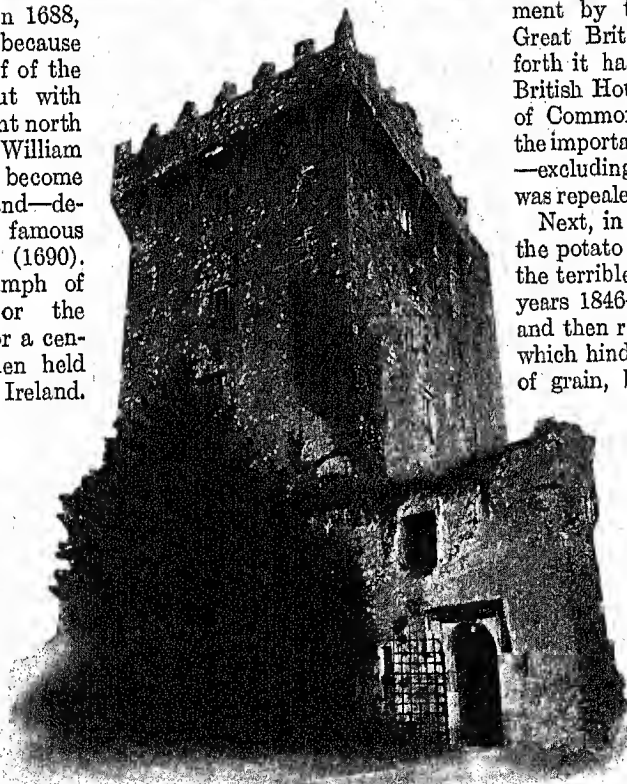


O'Connell Street, named for the Irish patriot, Daniel O'Connell, is one of Europe's famous boulevards. O'Connell Bridge in the foreground crosses the River Liffey. In the distance is the Nelson Pillar, 134 feet high, topped by a statue of Admiral Nelson.

Then when James II was driven from England in 1688, Ireland supported him because of his efforts in behalf of the Catholic religion. But with the aid of the Protestant north and an English army, William of Orange—who had become William III of England—defeated James at the famous Battle of the Boyne (1690). This meant the triumph of Protestant Ulster, or the "Orangemen," who for a century and a half then held almost all power in Ireland. Catholics were debarred from voting or holding office, and even from educating their children in their own religion. Catholic church services were forbidden under penalty of death. The result of such persecution was to intensify the Catholicism of Ireland and to sow broadcast the seeds of lasting bitterness.

At the very end of the 18th century Ireland was bribed

THE SEAT OF THE "BLARNEY STONE"

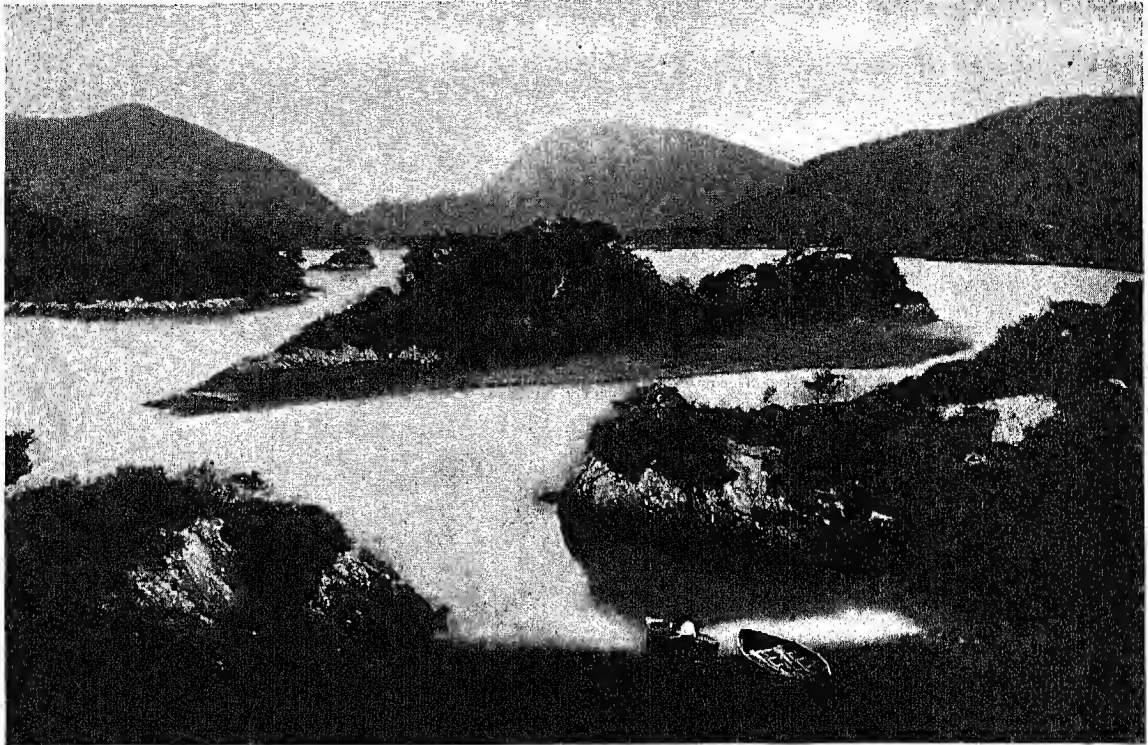


This is the famous Blarney Castle, near the city of Cork. As you doubtless know, there is a stone set in the wall of the building, which according to tradition confers remarkable powers of persuasion upon anyone who kisses it. The Castle was built in 1449 by Cormac McCarthy.

into giving up its separate Parliament by the Act of Union with Great Britain (1800), but thenceforth it had representatives in the British House of Lords and House of Commons. In 1829 the last of the important laws against Catholics—excluding them from Parliament—was repealed (see O'Connell, Daniel).

Next, in 1845 a blight destroyed the potato crop, and there followed the terrible sufferings of the famine years 1846-47. England suspended and then repealed the "Corn Laws" which hindered the free importation of grain, but thousands died, and millions emigrated. From that time on the people have been leaving Ireland for other lands, until today it is said that there are four times as many Irish in America as in Ireland itself. Before the great famine Ireland had a population of more than 8,000,000, but today its people number only about half what they were some 80 years ago.

A GLIMPSE OF KILLARNEY'S FAMOUS LAKES



Here you see a portion of the famous lakes in the southwest of Ireland. The lakes lie in a beautiful natural basin, hemmed in by mountains, and are studded with finely wooded islands, many of them crowned with picturesque and historic ruins.

The latter part of the 19th century saw a belated effort on the part of English statesmen, led by Gladstone, to undo some of the old wrongs in Ireland (see Gladstone, William Ewart). In 1869 the Protestant Church of Ireland was disestablished, that is, deprived of its position as a state church. The Land Acts of 1870, 1881, and 1885 protected tenant farmers in their holdings, reduced their rents, and made it possible for them to buy their farms on easy terms. The great Irish leader Parnell met English resistance to reform with boycotts and other reprisals (see Parnell, Charles Stewart). But concessions brought only temporary peace. The majority of the Irish wanted self-government, and although Gladstone's two efforts (in 1886 and 1893) to put Irish Home Rule bills through the British Parliament ended in failure, the demand for it became so violent and so general that it could no longer be refused.

By 1912 the only serious obstacle to achieving Home Rule was the determination of two-thirds of Ulster to remain in the United Kingdom. Premier Asquith himself introduced a Home Rule bill in 1912, which was passed in 1914. Ulster prepared for rebellion, but the World War intervened and Asquith suspended the operations of the law.

Southern Ireland Rebels

The Irish of the south had waited too long, however, to be put off by even a World War. Their resentment broke out in April 1916 in the Easter Rebellion, when

troops seized important buildings in Dublin and proclaimed a republic. The rebels suffered severe punishment. Thousands were arrested; Sir Roger Casement, found guilty of seeking German aid, was hanged for treason; 15 other leaders were executed. These reprisals aroused such indignation that Asquith hastily tried to apply the Home Rule Act of 1914. Again Ulster ruined negotiations by demanding exclusion.

Lloyd George, the next premier, called a convention to discuss a compromise. Disregarding him, the revolutionary party, Sinn Fein (*shin fān*, "ourselves alone"), met in October 1917, voted a republican constitution, and elected as president Eamon de Valera, one of the few surviving leaders of the Easter Rebellion. In the general election of December 1918, Sinn Fein won 73 of the 105 Irish seats in the British Parliament. But, instead of taking these seats, the Sinn Fein members established the Dail Eireann (Irish assembly) in January 1919, and elected delegates to the Paris Peace Conference.

When their delegates were refused recognition, Sinn Fein turned again to violence, and two years of terror followed. Attempting to obtain peace, Lloyd George put a new Home Rule bill through Parliament in December 1920. The bill proposed separate parliaments and separate ministries, one for Ulster and the other for the remainder of Ireland. Ulster's six Unionist counties accepted the plan with alacrity, and in May 1921 Northern Ireland began its separate existence.

In Southern Ireland, republican sentiment only flamed more hotly. British efforts to put down rebellion with a force of "black-and-tans" (ex-service men in khaki, with black caps and arm bands) aroused furious resentment. At length, Lloyd George proposed a treaty making Southern Ireland a dominion. De Valera and his extremist republicans refused to accept it. But other Sinn Fein leaders signed the treaty and persuaded the Dail to accept it Jan. 16, 1922. The new dominion was called the Irish Free State. (See also Ireland, Northern; Irish Free State. For other articles on Ireland and its history, see Ireland in the Fact-Index.)

IRELAND, NORTHERN. When most of Ireland was demanding home rule, six of the nine counties in the province of Ulster opposed all attempts to separate them from the United Kingdom. Two-thirds of the people in this region are Protestants, most of them descendants of the Scottish and English colonists who were "planted" in ancient Ulster in the 17th century. They have remained essentially British, and they preferred to keep their status as part of the United Kingdom rather than to become a small Protestant minority in a predominantly Catholic united Ireland.

These six northeast counties—Antrim, Down, Armagh, Fermanagh, Londonderry, and Tyrone—together make up only one-sixth of Ireland. They have an area of 5,237 square miles, a little greater than that of Connecticut. The country is rolling, with rounded hills which are a continuation of the Scottish Highlands. Large sections of land are used for grazing, for the live stock industry is the most important branch of agriculture in Northern Ireland. Cattle, sheep, pigs, and poultry are raised for local and English markets. Dairying is a considerable industry, but only for local consumption. Although there is comparatively little level land, more than a fourth of the total area is devoted to crops. Hay is grown on nearly half of this acreage and oats on nearly a fourth of it. Most of the remainder is in potatoes, turnips, flax, and fruit. A large percentage of the farms are holdings of 30 acres or less.

Manufactures and Other Industries

Agriculture, however, is not the chief industry, as it is in the Irish Free State; for the greatest manufacturing region of Ireland centers about Belfast, the capital of Northern Ireland and its busiest seaport. In this parliamentary borough and its neighboring towns are concentrated more than half the population of the six counties. Londonderry, the second city, is also a manufacturing center and a seaport. The chief industry in both cities is the manufacture of linen, which employs about one-third of all the coun-

try's factory workers. (See Flax.) Much of the flax is imported from Russia, the Baltic States, and Belgium; the manufactured goods have many foreign markets, especially the United States and Australia. Shipbuilding, the other leading industry, is centered at Belfast, which can conveniently import iron and coal from England (see Belfast). There are many smaller industries, such as flour milling and the manufacture of machinery, rope and twine, clothing, distilled liquors, tobacco, and soaps. Herring and salmon are the chief fish caught. Clay, chalk, granite, and sandstone are quarried. There is no coal worth mining, and all the coal consumed is imported from Great Britain.

Northern Ireland's Stormy History

By the terms of the Anglo-Irish Treaty of 1921, the six Unionist counties of Ulster remained a part of the United Kingdom. The other three counties joined the Irish Free State. The events leading up to this step are described in the article Ireland.

Ulster's history after 1921 continued to be stormy. Within Northern Ireland itself, fierce dissension arose between the Protestant Unionist majority and the Catholic minority that favor joining the Free State. Relations between Northern Ireland and the Irish

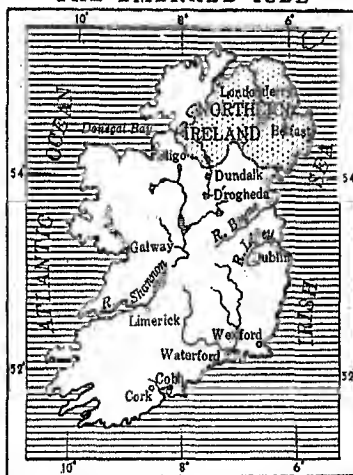
Free State were difficult. Efforts of Free State leaders to bring the northern counties into the Free State were ill received, and a four-year dispute over boundary lines almost started a civil war. The Free State claimed the counties of Fermanagh and Tyrone and several border towns. In 1925, however, this difficulty was settled by agreement, and Northern Ireland retained the disputed territory.

Economic barriers, as well as racial and religious differences and political loyalties, prevent the union of the two Irelands. Northern Ireland's leaders are conservative, and they believe that the country's prosperity depends upon continuing to encourage the spirit of private enterprise on which its great industries were founded. Hence they dis-

like and fear the economic policies of the Free State, with its experiments in government control and co-operation in agriculture and industry.

Northern Ireland has a considerable measure of self-government. It has a parliament consisting of a senate and a house of commons. The executive power is vested in a governor appointed by the British crown. The governor is advised by a cabinet of ministers, who are responsible to the local parliament. Certain legislative and financial powers are reserved to the British Parliament, to which Northern Ireland, as a part of the United Kingdom, elects 13 members. Population, about 1,280,000.

THE EMERALD ISLE



Of the island's 32,000 square miles, Northern Ireland has about one-sixth; Eire occupies the remainder.

IRIS. Irises have played a prominent part in art, history, and folk-lore. Because of their many colors they take their name from Iris, the Greek goddess of the rainbow. Architects and sculptors have used them as models since the days of ancient Egypt, and in the 12th century Louis VII adopted the fleur-de-lis, a conventionalized form of a wild European iris, as the emblem of the French royal house. In the 6th century iris preparations were recommended for removing freckles and curing ulcers. A British physician of the 16th century wrote that iris broth used as a mouth wash would make loose teeth firm again. Today the fragrant orris-root, obtained from the rhizomes (rootstocks) of certain species, is used as a base in dental powders, cosmetics, and perfumes. Irises are valued primarily, however, for their beauty and adaptability to landscape gardening.

These showy flowers range in color from white and yellow to deep blue and purple. They grow wild throughout the north temperate zone; below the Equator they are replaced by the closely related genus *Moraea*. The bearded iris, a garden favorite, needs plenty of sunshine and is easily cultivated in well-drained soil. The beardless iris requires abundant moisture during the spring months, and several species may be used as aquatics. Several members of the crested iris group are popular in rock gardens. Some of the wild species are popularly called flags, because they wave in the breeze like banners. The iris is the state flower of Tennessee.

Family name, *Iridaceae*; genus *Iris*. Rhizomous species commonly grown in America: Common Blue Iris (*I. germanica*), bearded (beard-like hairs on sepal), stem about two feet long, sword-shaped leaves; *I. variegata*, bearded, 15-inch stem, yellow flowers; Larger Blue Flag (*I. versicolor*) and Slender Blue Flag (*I. prismatica*), beardless, native to the United States; Japanese Iris (developed from *I. kaempferi*), beardless, flowers range from white through purple, widely cultivated; Crested Dwarf Iris (*I. cristata*), small lilac colored flowers, white crest (on sepal) tipped with orange. Bulbous species, rare in this country: *I. xiphium*, a Spanish iris, short stem, variable color.

IRISH FREE STATE (officially called **IRELAND** in English and **EIRE** in Gaelic). In 1922 the Irish Free State was created as a self-governing unit of the British Commonwealth. In 1937 it adopted a new constitution proclaiming itself a sovereign independent state to include the whole of Ireland and to be officially known as Ireland. But since its government at present has no power over Northern Ireland, it is still commonly spoken of as the Free State, to avoid confusion with the island as a whole.

The people of the Free State's 26 counties have a lively sense of their differences from the people of Northern Ireland. The hills of ancient Connaught and the islands of the west shelter the descendants of the ancient Gaels. And the transplanted English here, unlike those in Northern Ireland, have become thoroughly Irish through adoption of Celtic ways.

The character of the land, its abundant rainfall, and its lack of raw materials for manufacturing predestined Ireland to become an agricultural country,

with stock-raising as the chief industry (see Ireland). The animals raised in the Free State are still the chief source of its income. The area devoted to crops is being constantly increased, however; and industries dependent on agriculture for their raw materials are being developed by the government in the effort to make the country less dependent on imports. The leading crops are oats, potatoes, turnips, barley, wheat, sugar beets, and cabbage. Great Britain is a convenient market for the Free State's surplus beef cattle, sheep, horses, pigs, and poultry, as well as for dairy products and eggs and the famous Irish bacon. Potato growing and pig rearing go hand in hand on many small farms, because potatoes are excellent food for pigs. For more than two centuries dairying has been an important branch of the Irish farming industry, and there is a large demand for Irish butter in the British market. Most of the creameries are run on the coöperative plan.

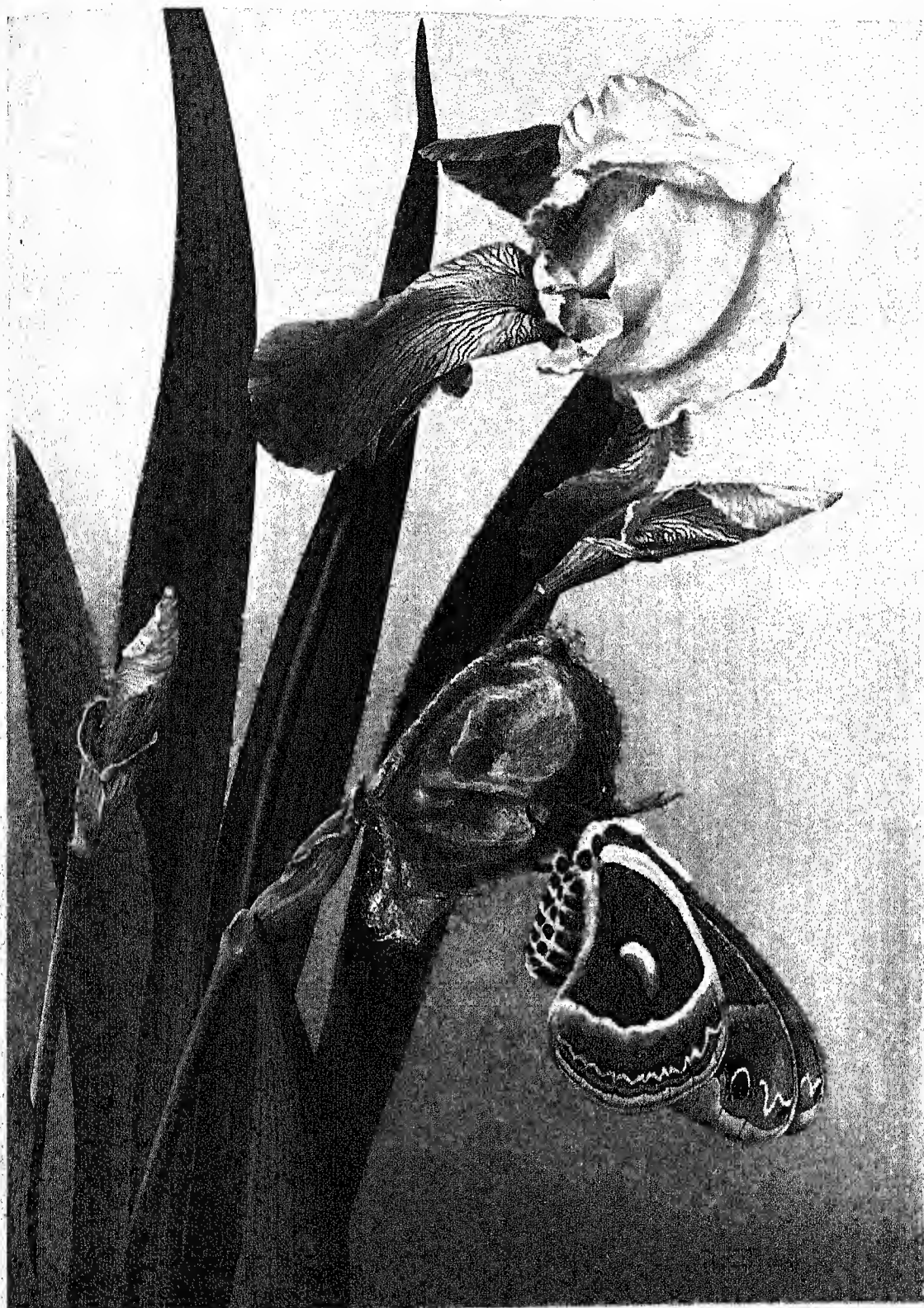
Government Aid in Agriculture and Industry

The creation of small farms from large holdings, in progress for many years, has been speeded up by the government. Steps have also been taken to help the farmer improve his products and to establish a better balance between agriculture and industry.

In the great bogs of the central lowlands quantities of peat are cut by hand; peat heats many an Irish home, for imported coal is expensive. Fish has never been a popular food with the Irish people, as it has with the English, but the Free State government is trying to make fishing a major pursuit. Herring and mackerel are the chief products of the deep-sea fisheries, and salmon is the most important fresh-water fish. Shellfish—crabs, crawfish, lobsters, and oysters—are also taken.

Industry has made good progress in the Free State, stimulated by the government's dream of economic independence. Lack of coal had always been a serious handicap, but the completion of a large hydroelectric plant on the Shannon River in 1929 made manufacturing practical. In 1932 the government gave great impetus to manufacturing of all kinds by offering loans and establishing high protective tariffs. Free State industries depend largely on the country's agricultural products for raw materials. Increased production of wheat demanded additional flour mills and by 1934 practically enough flour for home needs was being milled, though a considerable part of the wheat used was imported. Sugar factories using home-grown beets have cut down sugar imports to a minimum. More than half of the country's boots and shoes are now of local manufacture. Other industries include brewing and malting and the manufacture of tobacco, clothing, woolens and worsteds, wood furniture and upholstery, distilled liquors, confectionery, bricks, soap and candles, paper, and glass.

Factories are widely distributed through the country, in line with the government's policy to prevent concentration in one or two areas, to add variety to the life of the countryside, and to provide spare-



From a photograph by Lynwood M. Chace

Painting by Jean M. Ellwein

BEAUTY RIVALS—THE IRIS AND THE MOTH

BEAUTY RIVALS—THE IRIS AND THE MOTH

FOR beauty and variety of form and coloring, the iris family is unmatched in the world of flowers save, perhaps, by the orchids. Irises might, indeed, be called the orchids of the north, for they are found throughout the temperate zones of North America and Europe. And among the handsomest of the family is the one shown on the preceding page in full bloom and color—a variety of the species called *Iris germanica*, the German garden iris.

Upon the stem of this flower the photographer suspended for comparison a cocoon of *Samia cecropia* at the moment the moth was ready to emerge. When it first crawled from its gray wrapping, the cecropia's wings were limp and crumpled as the petals inside a flower bud. Then the tiny pumping organs inside the moth's body began to work, forcing blood into the wing veins, spreading and expanding them more rapidly than the unfolding of any flower. Clinging to its support the cecropia fanned and dried its new-spread wings. Its long body, a relic of its caterpillar days, shortened, thickened, and grew firm; its feathery antennae straightened out; its legs waxed strong and steady.

Between the iris and the cecropia, both in the fullness of their mature beauty, is more than a surface resemblance. The flower above has spread its "wings" to attract the insects that will fertilize its seed. The moth (a female) is ready for its nuptial flight which will bring it to a mate and the laying of its eggs. Whether we prefer the delicate shaded tinting of the iris or the strongly etched pattern of the moth, each has the "fitness for its purpose" which, the philosophers tell us, is the test of true beauty.

time occupations for the farmers. The population is mostly rural, and the only cities of any size are the seaports. Dublin (Baile Atha Cliath), the capital and largest city, and Cork, the second city in size, with its outport Cobh, owe their growth chiefly to trade with Great Britain. Their industries, however, are increasing. Limerick (Luimneach) is the most important port on the west coast. Ireland's beautiful scenery and fine roads bring the country a profitable tourist business. The west coast port of Galway is a favorite resort.

Education is free and compulsory for children under 14. Dublin, Cork, and Galway have branches of the National University. The government has pushed the revival of the Gaelic language (Erse), and the constitution of 1937 made it the national language.

History

The Irish Free State came into existence in 1922 with the ratifying of the Anglo-Irish Treaty (see Ireland). A provisional government headed by Arthur Griffith and Michael Collins took over Dublin Castle in January 1922, and Ireland hailed the departure of 60,000 British troops. But the Free State had stormy sailing from the first. Already at odds with Northern Ireland (see Ireland, Northern), it was plunged into civil war by Eamon de Valera and his followers, who were insisting on a republic. Griffith died in August, and ten days later the rebels shot down Michael Collins. In the ensuing fury of indignation William Cosgrave, a Free State champion, was chosen to succeed Collins. In October the Dail Eireann (Irish assembly) framed a constitution, under which Cosgrave was made president of the executive council, an office that corresponds to that of prime minister.

The task of restoring order was a difficult one, but the new government was at last free to lay the foundations for the new state. A protective tariff was adopted, a tax bill was passed, courts were established, and many measures were taken to improve economic conditions in the country. In 1923 the Free State became a member of the League of Nations.

Not the least of Cosgrave's accomplishments was the building of the hydroelectric plant on the Shannon. But his government was unpopular, chiefly because of its vigorous enforcement of the law, its high taxes, and its policy of drastic economy. As a result, he

was defeated by De Valera in the general elections of 1932.

De Valera at once began to take steps leading toward complete independence from Great Britain, although he held that a united Ireland should come before a free Ireland. The oath of allegiance to the crown was abolished, and in 1935 Free State citizenship was established to supplant British citizenship.

The new government mapped out an extensive program of social as well as political and economic reform, including unemployment relief, government housing, and improved public health measures.

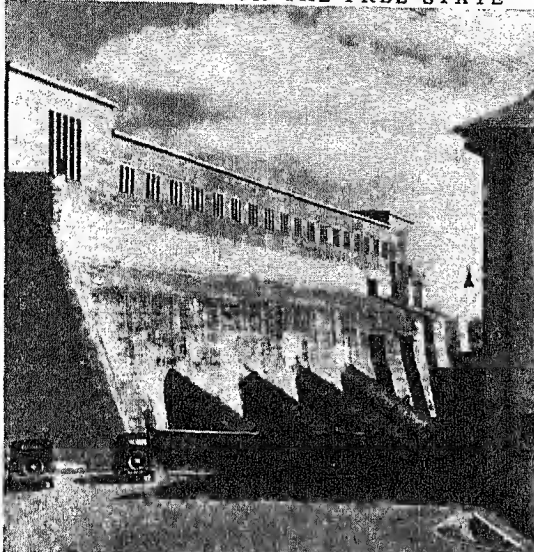
One of De Valera's measures led to a bitter tariff war with Great Britain. He refused to continue to pay to Great Britain the land annuities. These are installments from the Irish farmers who are buying their land under the land purchase acts passed by the British parliament between 1897 and 1901. De Valera, claiming that Great Britain never had a right to the land, retained the payments in the Irish treasury. This led to a six-year trade war, which

ended in 1938 by the signing of a treaty on commerce and defense. This treaty remained one of the few formal ties binding the Irish Free State and Great Britain. The new constitution adopted in 1937 had abolished the office of the governor-general and proclaimed the Free State a sovereign, independent nation. Though still nominally a member of the British Commonwealth of Nations, the Free State had sent no representatives to the Imperial Conference of 1937. The full extent of its freedom was demonstrated when, after the outbreak of war between Great Britain and Germany in September 1939, it was the only member of the British Commonwealth to declare its neutrality.

The constitution of 1937 declares all Ireland independent, with the old Gaelic name Eire. It provides for a president, elected by popular vote; a prime minister; a council of state; and a parliament of two houses, the Dail Eireann and the Seanad (senate). Douglas Hyde in 1938 became the first president of the state. Area, 26,600 square miles; population, nearly 3,000,000.

IRISH LITERATURE. While all western Europe was still a barbarian wilderness, Ireland already had a rich culture and an extensive body of literature in the Gaelic language, preserved by word of mouth. In the 5th century A.D., scribes began to write down

WHITE COAL FOR THE FREE STATE



The great hydroelectric station on the River Shannon has solved one of the greatest problems of this coalless land—providing cheap power for industry. It is capable of supplying enough electric power to run all the country's industries and to supply heat and power for every town and farm. This picture shows the penstocks (19½ feet in diameter) which carry the water from the intake building, a concrete gravity dam (left) down to the power house.

what was remembered of the ancient stories. These tales still keep alive the glorious history of Ireland, for many modern writers have retold them in English; and they form a valuable contribution to the folk-lore of the world (*see* Story-Telling).

Legend and Folk-Lore

These sagas fall into three main groups. The first, the Legendary Cycle, deals with a mythological world (perhaps 3300–1000 B.C.) peopled with the shadowy figures of the gods and demi-gods of the early Irish. Here we find the goddess Eire and the god Ir, from whom come the names Eireann (or Erin) and Ireland. Best known of the deities are Lugh the Long-Handed, the sun god, and Balor of the Evil Eye, god of darkness and death. The blond, godlike People of Dana (Tuatha de Danánn) finally disappear from earth and take up their abode inside the hills of Ireland as Sidhe ("shee," or fairies). But in later stories the gods come back to take part in the fortunes of men.

The second group, the Red Branch Cycle, tells of the Irish world of about the first century A.D. This world is inhabited by mighty warriors, beautiful women, and gifted poets. The poets, or story-tellers, were revered by all; even the heroes dreaded the barb of their satire and desired to do brave deeds that might win praise in a song. This cycle, sometimes called the Ultonian, treats especially of the wars between Connaught and Ulster, and the mightiest hero is Cuchulain, "The Hound of Ulster," most famous of all the warriors of Red Branch Hall. In the best known episode, 'Táin Bó Cúailgne' (The Cattle Raid of Cooley), when Queen Maeve of Connaught tries to seize the wondrous Dun Bull, Cuchulain for a time holds at bay the armies of three provinces. Other stories in the cycle tell of the tragedy of Deirdre, who for love defies her prophesied fate and brings death to her husband and his brothers, the sons of Usnach.

The Fenian Cycle, the third of the groups, pictures an Ireland of about 200 A.D. These tales were closer to the interests of the common people; and story-tellers kept adding to them even down to the 18th century. Today the name of Finn MacCool is still a household word in every part of Ireland. Fionn MacCumhail is leader of the Fianna ("militia") of Ireland. His grudge against the kingly house, whose champion has slain Fionn's father, is the main theme of the cycle. When the Fianna go down to defeat, Fionn's son Ossian, the bard, is almost the sole survivor. In a later cycle of stories, this hero returns to Ireland after spending 300 years in the Land of the Ever Young, and debates with St. Patrick over the relative merits of the pagan and Christian worlds.

Literature of Early Christian Times

The piety and learning which blossomed under St. Patrick in the 5th century turned Ireland into the "Island of Saints and Scholars" (*see* Hebrides Islands; Patrick, Saint). Students came from everywhere, fleeing from Europe's Dark Ages. A flood of manuscripts recorded the old stories and the new religious writings—saints' lives, books of hours, and the like.

All but a handful of these manuscripts perished during the Danish invasions (795–1000 A.D.) or later. Fortunately, during the 11th and 12th centuries scribes copied or revised older manuscripts then existing, and much of their work survives. From then until the end of the 17th century, most of the new literature came from the bards (minstrels) rather than from the churchmen. It consisted mainly of laments, satires, annals, histories, and legendary genealogies.

English-Irish Literature

With the steady increase of English domination in Ireland, especially during the 18th century, most of the old great families died out or allied themselves with English culture. The native literature became oral again, living only in the memory of the people. The best known writers of that period—Jonathan Swift, Oliver Goldsmith, Richard Steele, Edmund Burke, Richard Brinsley Sheridan—belong properly to English literature (*see* English Literature). More truly Irish in subject and spirit are the novelist Maria Edgeworth, and the caricaturist writers Samuel Lover and Charles James Lever, with their tales of peasant life and country squires.

Poetry still lived, in English forms and language. Gay and tuneful rhymes sing in the 'Irish Melodies' of Thomas Moore and the poems of Francis Mahony ("Father Prout"). Deeper feeling, springing from sincere love of beauty and pride in race, marks the work of James Clarence Mangan, with his matchless translations and patriotic poems, and Sir Samuel Ferguson ('Lays of the Western Gael').

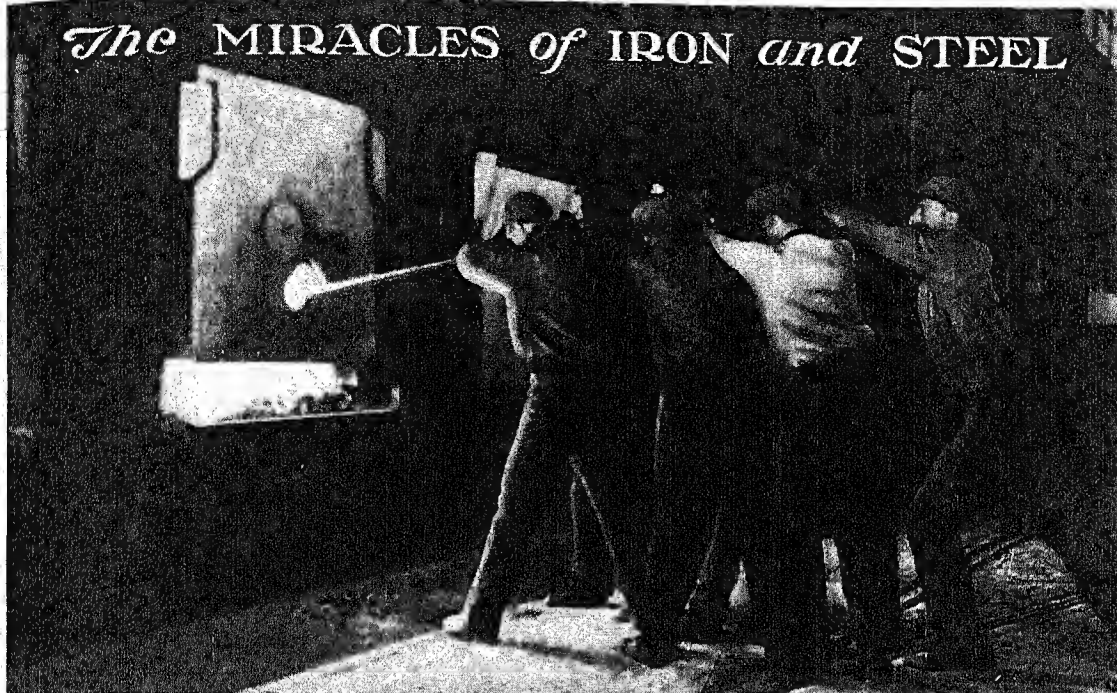
Irish Literary Revival

Late in the 19th century the Gaelic League began to collect and publish the remnants of the native folk literature. Side by side with this revival of the Gaelic tongue grew a literary movement of distinctively Irish writing in English. Although some modern writers—such as Oscar Wilde, George Moore, Bernard Shaw and Lord Dunsany—belong to English literature, present-day Irish literature owes its glory to those who felt the inspiration of the Irish Literary Revival. Stories of Erin's former greatness and her modern struggle for a life of her own stirred W. B. Yeats, Padraic Colum, Katharine Tynan, George W. Russell ("Æ"), and James Stephens. The greatest prestige came to the movement from the romantic tragedies and folk drama, written especially for Irish players, by the Abbey Theater group. Douglas Hyde, Yeats, Colum, Lady Gregory, Sean O'Casey, St. John Ervine, and Lennox Robinson were members of this group. Foremost of all was John M. Synge, master of both comedy and tragedy. He knew the heart of the Irish peasant, and portrayed with faithful realism and rich dialogue the baffling mixture of traits found in the Gaelic character.

The Irish Language

This language, known as Irish Gaelic, is a sister tongue of Scotch Gaelic and Manx, and belongs to the Celtic branch of the Indo-European family (*see* Philology). It is a highly inflected tongue. Its nearest relatives are the so-called "Brythonic" languages, including Welsh, Cornish, and Breton.

The MIRACLES of IRON and STEEL



Strength, Endurance, and Skill—A Crew at Work Before the Fiery Cavern of an Open-Hearth Furnace

IRON AND STEEL. Why is iron the real king of metals? What quality sets this common, plain, gray substance so high? The answer is simple. *Iron is the toolmaker.* Nearly all the tools that do the

world's work are fashioned of iron or of the specially treated iron called steel. The list includes the simple tools of the carpenter and the mechanic, the plumber and the electrician, the tailor and the shoemaker, the cook, and the gardener. It includes farm machinery and the giant tools of industry—the great steam shovels, the huge lathes and planers that cut and fit the parts of a locomotive or a battleship, the tremendous hammers and presses that can beat and squeeze tons of metal into shape in a few moments. It includes also the whole collection of our weapons—those deadly tools used in hunting and warfare.

Of all the materials in the world, only iron can be made strong, hard, tough, or sharp enough for all these different purposes. There are substances, like diamonds and carborundum, that are harder than the hardest steel, but even if they were cheap enough for general use, they would be too brittle for most of the jobs that steel is called upon to do every day.

Iron and Steel in Construction

Next to toolmaking in importance comes the use of iron as a building material in the construction of railways, ships, bridges, pipe lines, and skyscrapers. It is the chief material for making machinery of all

IRON is by far the most important metal in the world. Measured in money, other metals seem more valuable. Silver, copper, nickel, aluminum, tin, lead, zinc, and the rest of them, all cost more. For an ounce of gold you can buy two tons of iron. Yet none of the other metals could take iron's place. It would be easier for us to sacrifice all of them put together than to get along without iron.

kinds, from clocks to steam engines, and from automobiles and pumps to typewriters and printing presses. A few other metals or mixtures of metals, such as brass, bronze, and aluminum, are used in this

field, but for most construction work and machine building they are too weak, too easily worn out, or too costly to compete successfully with iron and steel.

Iron as a Maker of Electricity

Iron has a third vitally important application in modern life. It reigns supreme in the field of electricity. Magnetic action is needed to produce electricity on a large scale. And iron is the magnet maker. All electric generators, from the small ones in our automobiles to the giants that provide current for our cities, are made with iron cores. The same is true of all the electric motors that turn the wheels of industry and run our household appliances (*see Magnet; Electric Generator and Motor*).

Telegraph instruments, telephones, radio sets, electric bells, signal systems—all make use of the magnetic properties of iron. There are scores of other inventions and devices in this field that would have been impossible without it. Never would we have had an Age of Electricity unless we had first had the Iron Age.

A Close-Up View of Iron

What is the nature of this metal that does so many things for us? In the first place, it is one of the commonest of the 92 elements of which the world is

made. In the earth's crust only three elements are found in greater abundance than iron. They are oxygen, silicon, and aluminum (*see Earth*). Pure iron is silvery gray. We think of it as heavy, but it is one of the lighter common metals. A cubic foot of iron weighs about 485 pounds. Round figures for other metals are as follows: platinum, 1350; tungsten, 1210; gold, 1195; mercury, 850; lead, 710; silver, 655; copper, 555; nickel, 535; tin, 460; zinc, 440; chromium, 400; and aluminum, 165. Thus all the metals in this list are heavier than iron except tin, zinc, chromium, and aluminum.

Except in meteorites that have landed on the earth from outer space, iron is not found free in nature.

Iron is an essential element in the blood of men and animals. It helps to make the red coloring matter or hemoglobin that carries oxygen from our lungs to all parts of the body. The article on Hygiene tells us the best foods to eat so that we may get the iron we need to keep our blood in good condition.

Iron Is Most Useful in Mixtures

Absolutely pure iron is difficult to obtain and, except for scientific purposes, it is not very useful. Later on in this article we shall see that the properties of iron change enormously when small quantities of other substances are mixed with it. That is what makes iron useful to us in so many different ways. We can make it hard enough to cut glass and soft enough

WHERE IRON ORE IS DUG WITH STEAM SHOVELS



This picture shows you one reason why the United States is so great an iron-producing country. This is one of the open mines of the Mesabi Range in Minnesota, where the ore is so close to the surface that after the top soil is stripped away the ore may be loaded directly into cars by steam shovels. Thus an abundance of ore is obtained at comparatively low cost.

It combines too easily with other elements. We know how easily iron rusts. The rust is a combination of iron, oxygen, and water. But this is only one of the many common compounds of iron. Traces of them, at least, are found in most rocks and are chiefly responsible for rock coloration, including reds, yellows, greens, blacks, and many shades of brown. Red bricks owe their color to the iron in the clay out of which they are made.

Iron in Living Things

Iron is a part of the green coloring matter of plants. And when the autumn leaves turn red, it is iron in changed form that creates the new colors. Most fruits and vegetables get their hue from iron pigments.

to be easily shaped and hammered. We can make it rigid or flexible, coarse- or fine-grained, brittle or tough.

The most widely used forms are the various kinds and grades of steel. These always contain small quantities of carbon and usually some other substances as well, such as manganese, phosphorus, and sulphur.

Iron in Primitive Times

Historians say that our civilization had its real start when men first learned how to get and use iron. Before that time, tools and weapons were made of wood, bone, stone, or bronze (*see Stone Age; Bronze*).

We do not know when iron was first discovered. But long before history began to be written some lucky savage, happening to bank an excessively hot fire with

pieces of iron ore, found a lump of strange metal in the coals, and was inspired to pound its red-hot mass into shape between two stones. He thereby gained not only a very superior spearhead or sword, but much prestige among his fellows. The tales of divine

least two weeks more—not to mention the additional fuel—to convert the iron bars into steel. Clearly, iron and steel were then too precious for any but the most necessary uses.

Today our whole civilization is woven over a framework of iron and steel. The Age of Steel is the result of many innovations, discoveries, and inventions, some the evolution of centuries, the greater number the product of the last 100 years. The most notable of all—the Bessemer, Kelly, and the open-hearth processes of making steel—are less than a century old. All these methods have rapidly increased the amount of steel and metallic iron in the world.

The bulk of our commercial iron is produced from four ores, the most important being oxides (hematite, magnetite, and limonite) and one (siderite) a carbonate.

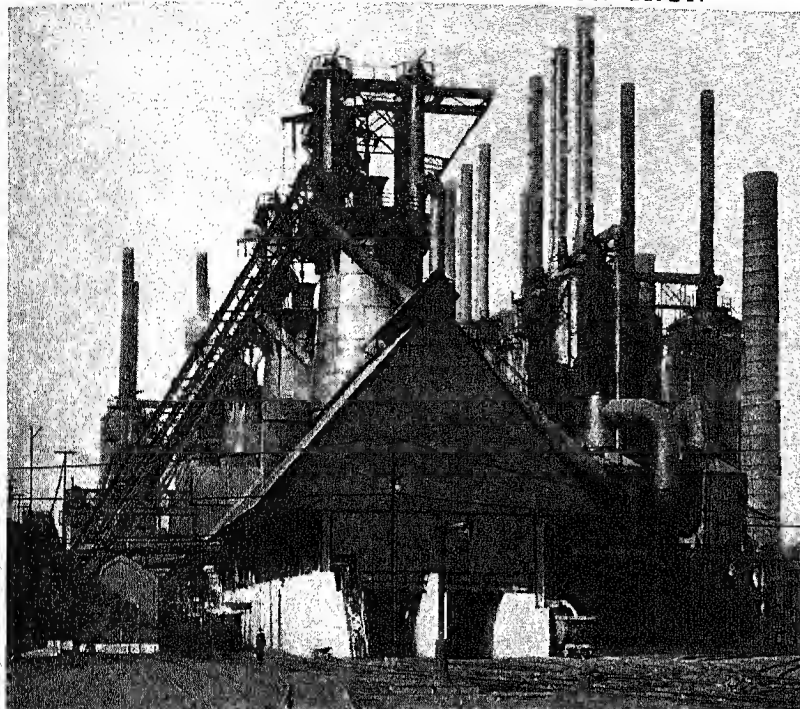
Hematite is the most widely distributed and important ore and is the kind produced in the great Mesabi Range of Minnesota. Most of it looks like soft red earth. Iron carbonate or siderite is a hard crystalline gray or brown ore that can be profitably worked only when

local fuel conditions are favorable. Iron pyrites (a compound of iron with sulphur), often called "fool's gold," is used in enormous quantities in making sulphuric acid. Other iron-bearing minerals occur, but only certain iron silicates are important.

The ores are generally mixed with impurities, such as silica, alumina, and lime. A rich ore contains more than 50 per cent of iron; an average ore, from 35 to 50 per cent; a poor one, workable under favorable conditions, from 25 to 35 per cent. Ores containing less than 25 per cent iron may be used locally if they have high fluxing properties.

Iron ores occur in commercial quantities on every continent and on many islands. The United States, the chief ore producer and consumer, accounts for one-fourth or more of the world's total output. Iron is mined commercially in about 18 American states. The world's greatest iron-mining center, producing more than half of this country's iron ore output, is the Mesabi district at the head of Lake Superior. Vast deposits of this ore lie in open-pit mines, from which it can be scooped up like sand by steam shovels that pick up two tons or more at a time. The

WHERE ORE BECOMES MOLTEN IRON



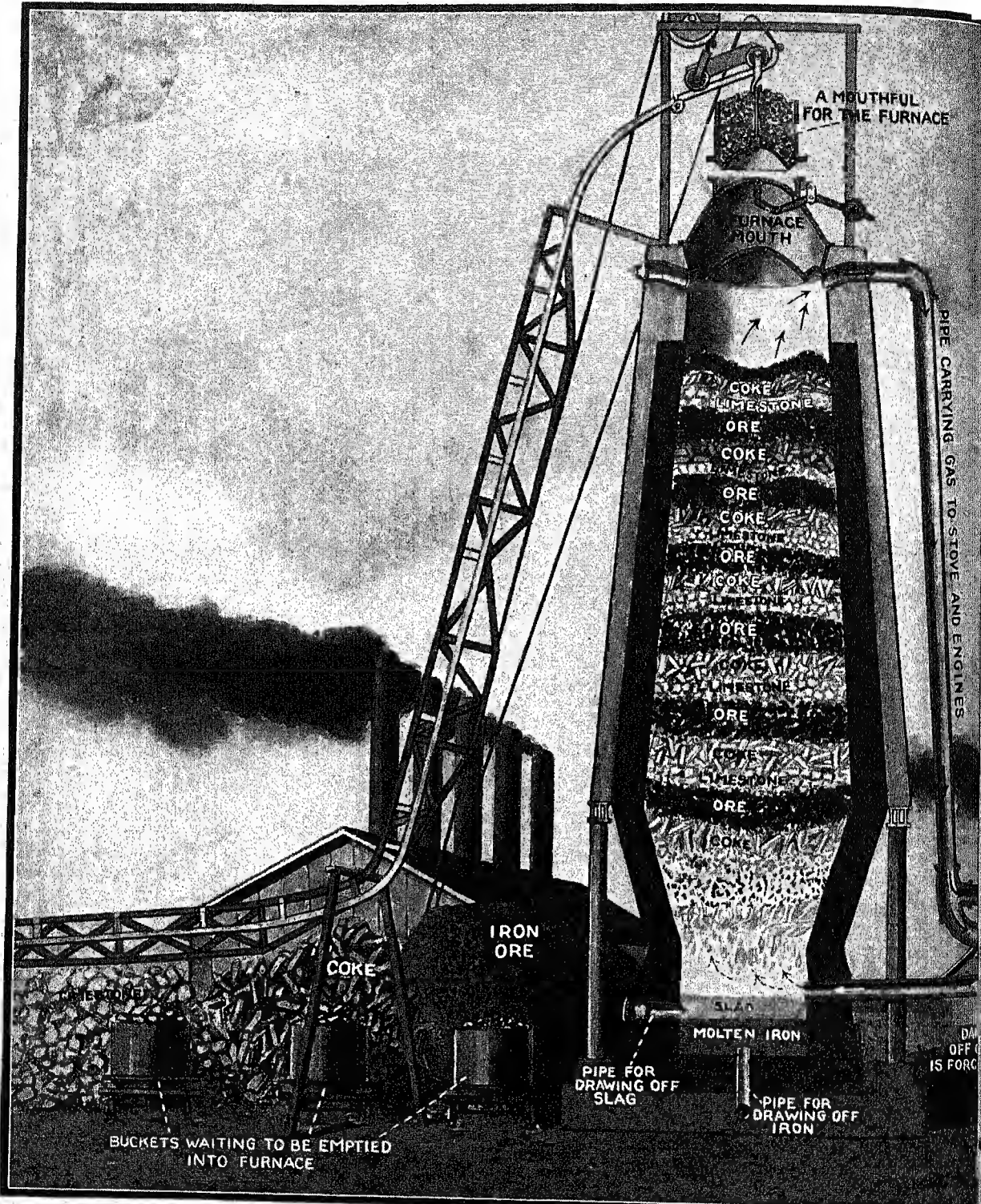
Here is a battery of blast furnaces where iron is melted from ore. The furnaces rise from the shed, and the inclined tracks at the left deliver ore and fuel into the furnaces. To the right of the shed are dust-catchers and the stoves which heat the air used in the furnaces. At the right-hand corner of the shed a slag pot on wheels is receiving the molten slag. It will be hauled to the mountainous cinder dump—a familiar landmark in steel cities.

smiths in many lands show the awed esteem in which the new craft was held. Magic went into the forging of mighty swords like King Arthur's Excalibur, Siegfried's Balmung, and Roland's Durandal. The uncanny metal itself, appearing so mysteriously, manifesting such terrible powers, has magic qualities in many old tales.

Something like this accidental discovery must have happened in many countries at one time or another. Among the peoples of the Mediterranean and the lands immediately eastward, iron seems to have been first extensively worked and distributed by the Hittites of Asia Minor, from whom the Assyrians learned its use. The terrible might of the conquering Assyrian army was largely due to the fact that it was the first to be equipped with iron weapons. From that time forth "iron, cold iron, is master of them all," in war and in peace.

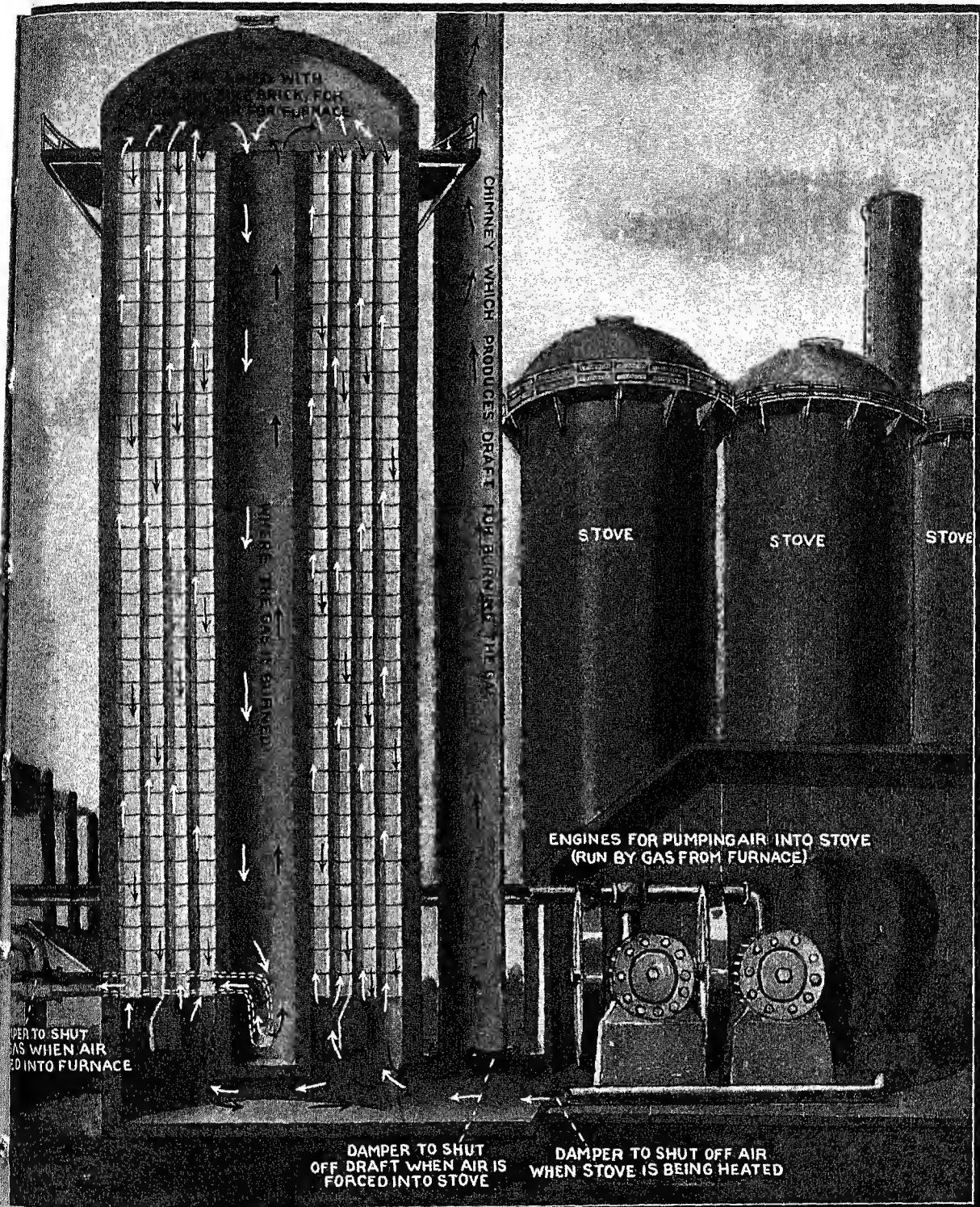
During ancient times and the Middle Ages, the highest output of a furnace was three or four tons of iron a week. Four loads of timber were required to make each ton of pig iron, and three additional loads to convert the pig iron into bar iron; and it took at

HOW THE MIGHTY BLAST FURNACE



In this drawing a blast furnace is shown as though it had been cut in two from top to bottom. It is simply a wide chimney, lined with fire brick. Coke, iron ore, and limestone are brought up the inclined track and dropped in alternate layers through the door at the top. When melted, the limestone and the impurities in the ore combine to form slag, and both the slag and the iron sink to the bottom. The slag, being lighter, floats on top of the molten iron, and both are drawn off at intervals through the drain pipes. The necessary ingredients are fed in constantly, in order to keep the furnace in continuous operation. So that no heat may be wasted, the furnace is supplied with heated air. The air supply and exhaust system which do this are explained on the next page.

COOKS THE IRON OUT OF THE CRUDE ORE



It takes several huge stoves to supply heated air for the blast furnace. One of these is shown in cross section above. A central flue opens into a chamber on top and from this chamber channels lead through fire-brick to another chamber at the bottom. At first hot gases from the furnace, represented by black arrows, enter the central flue, rise, and pass down through the side channels, heating the fire-brick. At the bottom they discharge through a chimney. Then dampers close the chimney and shut off the gas as shown, and air represented by white arrows is pumped the other way by the engines at the right. It is heated in the side channels, passes down the central flue, and enters the bottom of the blast furnace. Meanwhile the hot gases are heating another stove.

mining cost here is therefore very low. Transportation costs too are low. Great Lakes freighters carry the ore from Duluth-Superior to Chicago, Gary, Cleveland, Ashtabula, Buffalo, and other ports for less than a dollar a ton. Labor-saving machinery at ore docks has brought the cost of loading and unloading down to a few cents a ton.

Despite its vast reserves, the United States normally imports 3 or 4 per cent of the iron ore it uses. It imports some from Chile and Cuba because ore can be brought from these countries by water to plants on the Atlantic seaboard for less than the cost of hauling by rail from domestic sources. Swedish ore is imported because of its high quality.

The World's Chief Foreign Deposits of Ore

Outside the United States, the Lorraine-Luxemburg district is the chief producer of iron ore. Indeed, leadership in European ore production has been held alternately by Germany and France, depending on which one controlled the iron deposits of Lorraine. Other leading ore producers are Russia, Great Britain, Sweden, India, Greater China (with chief production in the Manchurian region), Spain, Algeria, Australia, the Malay States, Chile, Newfoundland, Morocco, Norway, and the Philippines.

Brazil has one of the world's outstanding reserves of iron ore, with an estimated 12 or 15 billion tons in the state of Minas Geraes alone. But production has been relatively small because of lack of coal to smelt the ore and of railways to carry it to seaports. South Africa too, notably in the Transvaal, holds huge stores of ore, which still await full development.

How Iron Is Smelted

To smelt iron requires terrific heat. This is produced in a blast furnace, a cylindrical steel shell perhaps 100 feet tall. It is lined with firebrick. Near the bottom are pipes to admit the forced draft or "blast" which gives the furnace its name.

Successive "charges" of coke, ore, and limestone are fed through the top until the furnace is ready

to fire. This is done by pushing red-hot steel rods into the bottom layer of coke. Blasts of heated air drive the fire upward. At 2,800° to 3,000° F., the iron and oxygen of the ore separate. The released oxygen combines with the carbon of the fuel and passes off as carbon dioxide gas. The heavy molten iron, holding small amounts of dissolved carbon, seeps down to the hearth and collects in a pool which may be as hot as 3,500° F. Meanwhile the limestone flux has combined with the earth impurities of the ore to form a glassy scum or "slag," which floats on the molten iron. Every four or five hours the slag is drawn off through a "cinder notch," and a lower hole—the "iron notch"—is tapped to draw off the molten iron.

The furnace is kept burning night and day perhaps for years. New charges are fed in as the old ones melt and sink. To let the furnace go out while charged

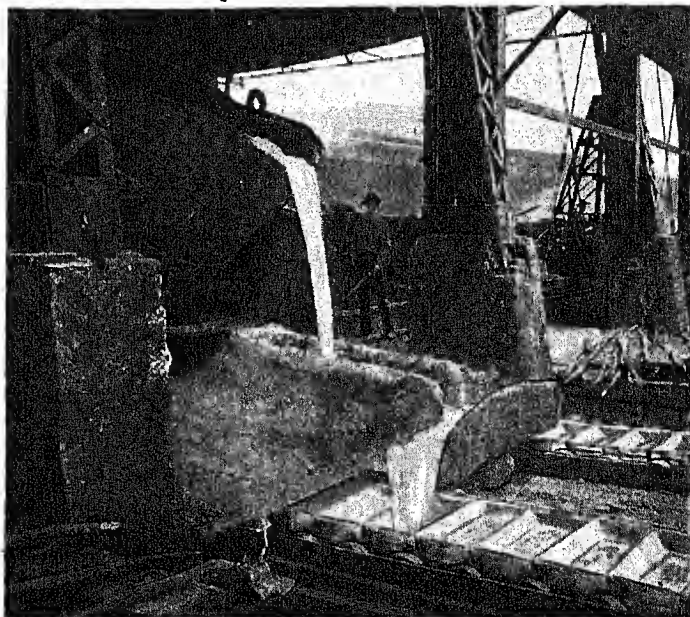
would be a costly calamity, for the molten materials within would solidify upon cooling and choke it. Hence, when the furnace must be shut down for repairs, it is emptied before it is allowed to cool.

Formerly, during the smelting process, the molten iron was drawn off directly from the furnace into sand trenches. From a main trench extended many small channels. Because of this arrangement, the main trench was called the "sow," and ingots molded in the small trenches were called "pigs." Today the liquid iron is often

rushed to the steel mill before it cools. Or it may be poured into a pig-casting machine like the one in the picture at the left. But whether it ever becomes a "pig" or not, the product of the blast furnace is still called "pig iron."

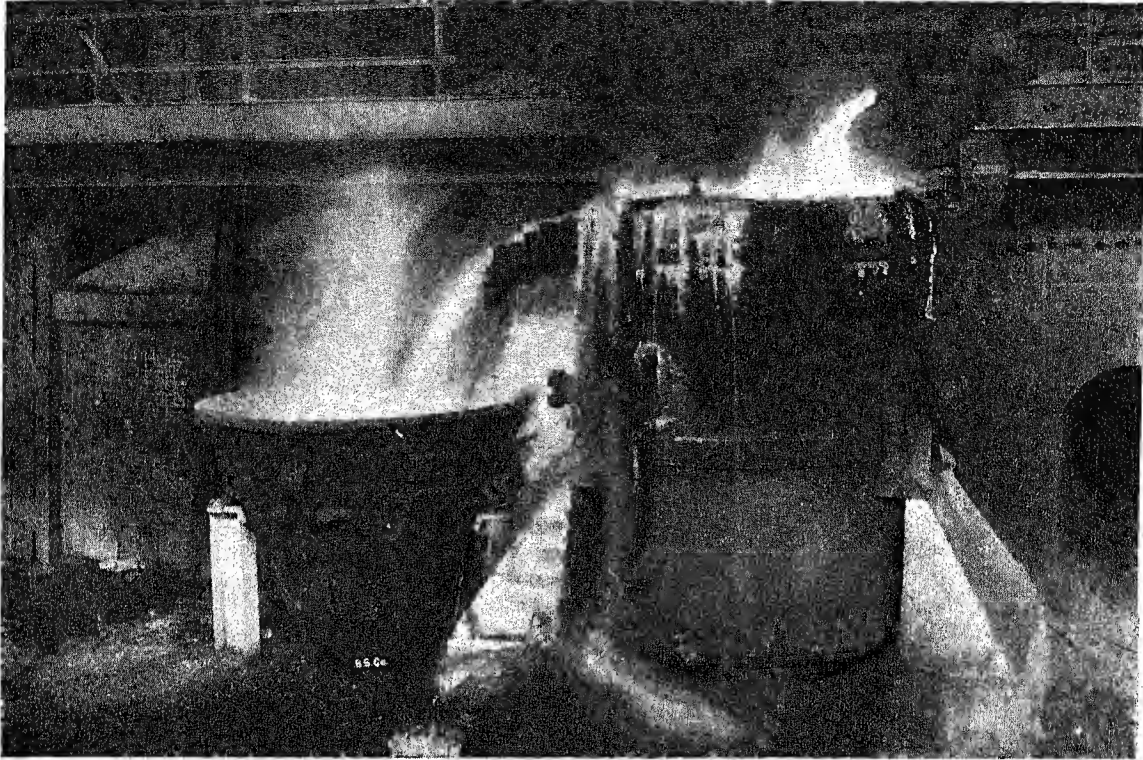
Before the invention of the blast furnace, iron was smelted in small forges which used charcoal as fuel. The iron was seldom completely melted so that the metal could be poured and cast; but it was kept red hot and hammered into shape as wrought iron. The growing scarcity of wood for making charcoal for a time checked the growth of the iron industry, but about 1735 the step was taken which made possible our modern furnaces, producing 600 to 1,200 tons of

WHERE THE LIQUID METAL TURNS TO "PIG IRON"

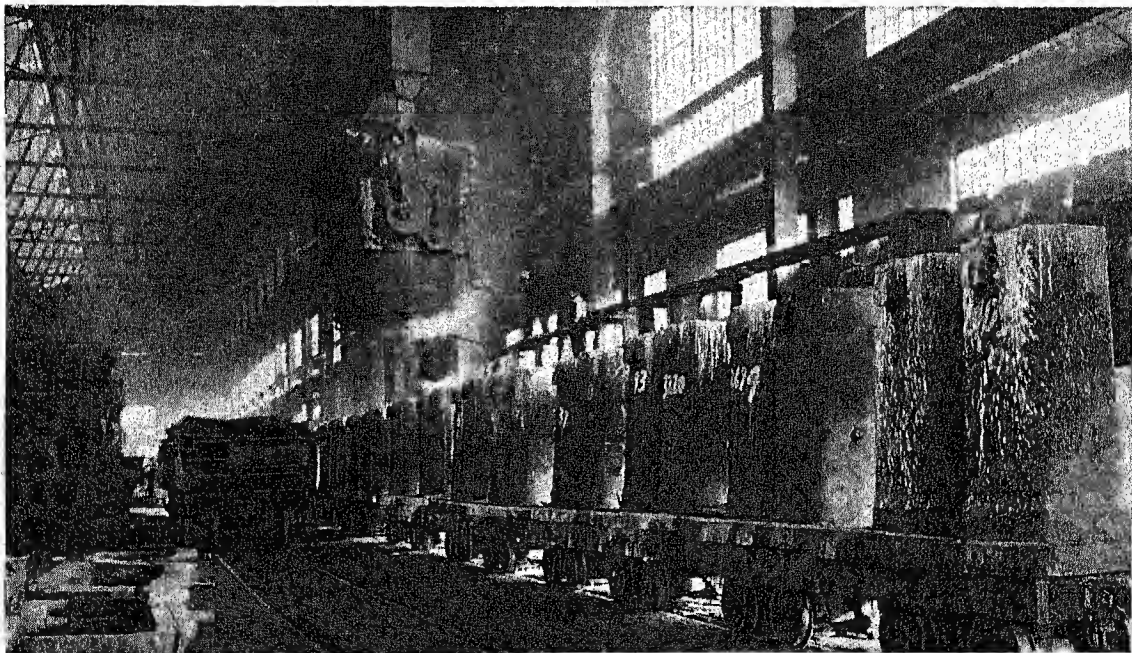


The huge ladle has just come from the blast furnace, and is pouring molten iron into molds. The molds are mounted on two parallel conveyor belts and these belts move slowly beneath that double "distributor" under the spout, so that each mold receives a full load. As the molds move along, the iron cools into 80-pound ingots called "pigs." This crude pig iron is then remelted for casting, or is refined to make wrought iron or steel.

IT GOES IN AS IRON AND COMES OUT AS STEEL

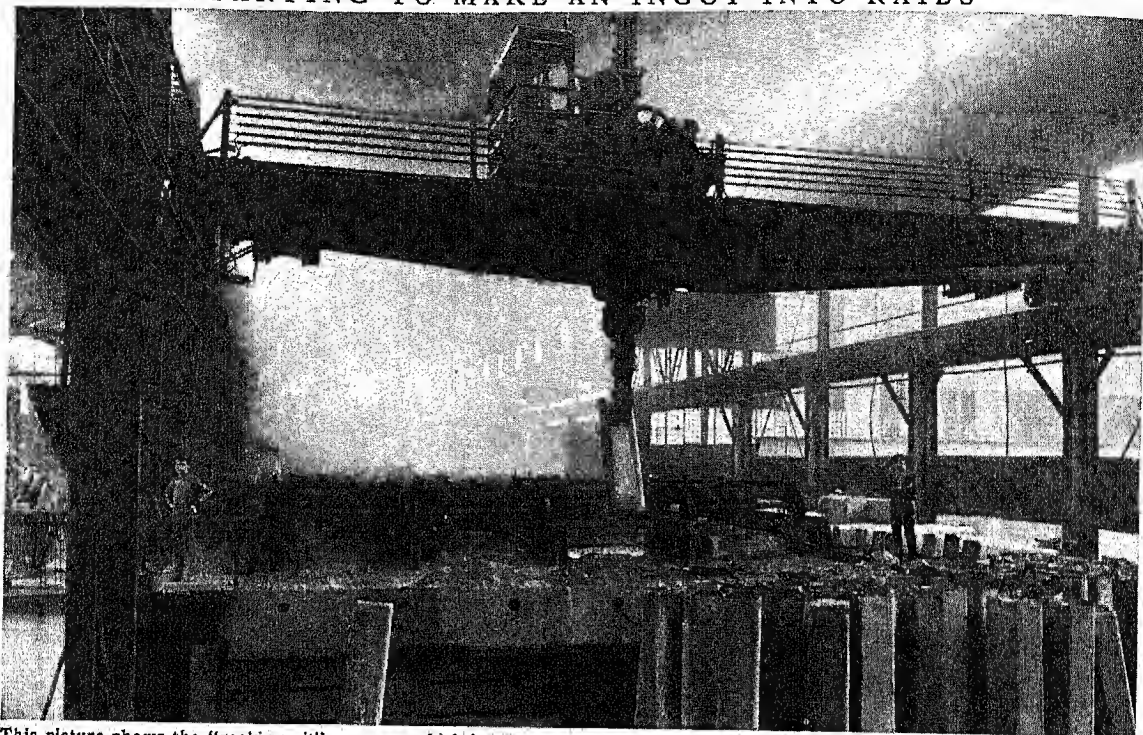


After hours of exposure to intense heat in the open hearth furnace, which is the brick structure in the background, iron becomes steel. When the transformation has reached the desired point, a clay plug in the drain-pipe is broken, and the molten steel runs out into the huge ladle, or cylindrical bucket, which you see to the right. The slag comes also, and flows off the top of the ladle into the conical receptacle at the left.

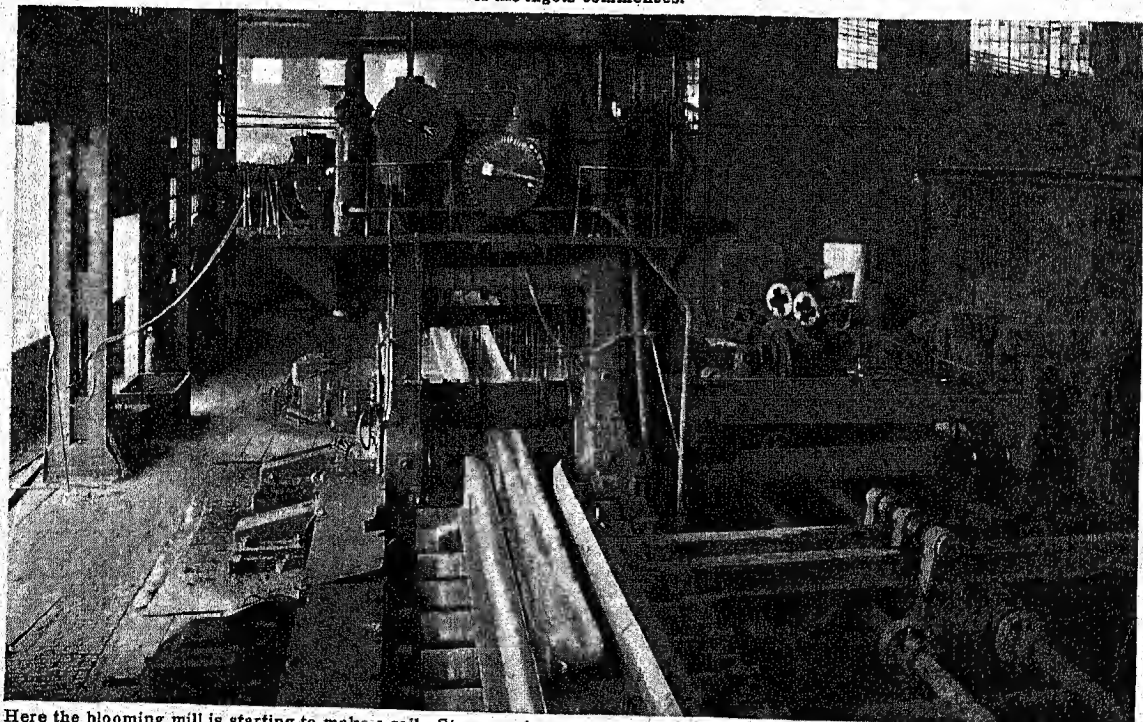


Huge hooks suspended from a traveling crane seize the ladle when it has been filled with molten steel at the open hearth furnace and swing it into line over a row of molds. A box equipped with one or more nozzles is placed beneath the ladle, and the ladle's vent is tapped. Thereupon the steel runs out into the molds, and cools into oblong ingots.

STARTING TO MAKE AN INGOT INTO RAILS

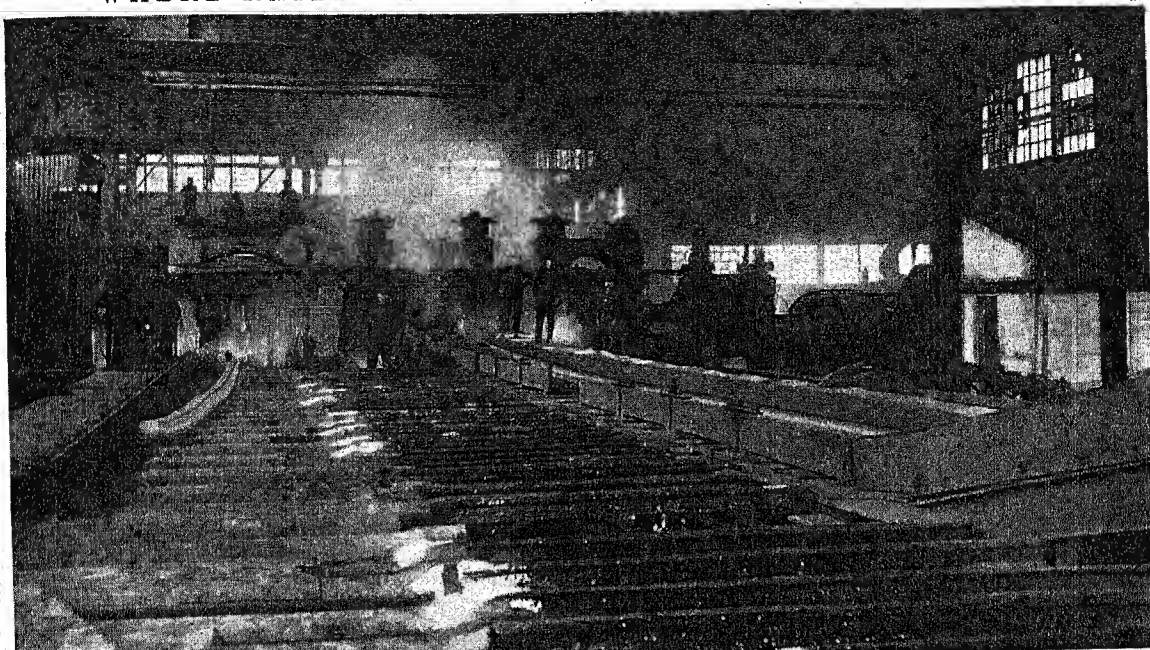


This picture shows the "soaking pit" process, which is necessary at the outset of steel rolling because when the ingots arrive at the mill, they are not hot enough to be rolled. The first step therefore is to place them in upright covered furnaces known as "soaking pits," and there they are brought to the proper temperature. When this has been done, the lid of the furnace is removed, huge tippers drop down from a traveling crane, withdraw a heated ingot and take it to the "blooming" mill, where the actual rolling of the ingots commences.

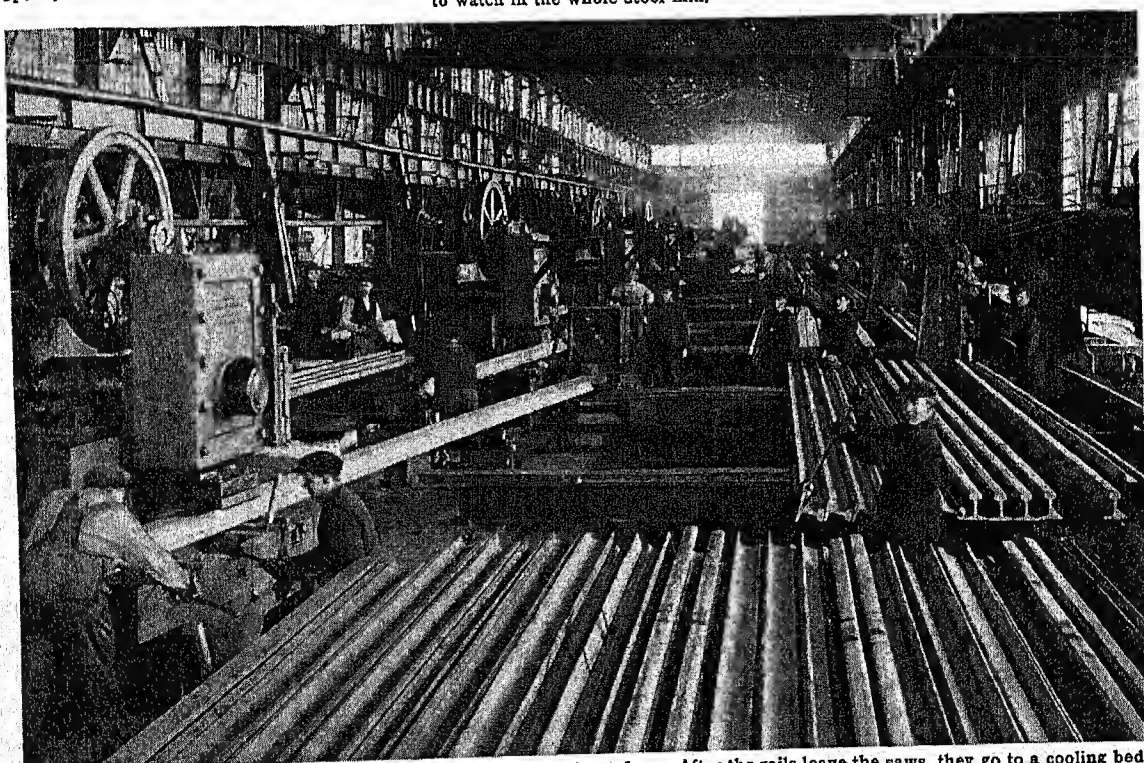


Here the blooming mill is starting to make a rail. Streams of water keep the rollers cool, and the top roller is movable. At first the rollers are set almost the thickness of the ingot apart. Then as the ingot passes back and forth the distance is lessened, until the ingot is reduced enough in thickness to go into the rail-rolling mill. When it is in this condition it is called a "bloom."

WHERE RAILS ARE TURNED OUT BY THE THOUSAND



This picture gives only a faint idea of how spectacular a process rail-making really is. When the hot "bloom" comes from the blooming mill, it is shot through a powerful roll, is squeezed down in size, and emerges upon a bed of rollers such as the one you see here, in the form of a long writhing snake of glowing hot metal. From bed to bed and roll to roll this long strip shoots at high speed, until finally it is shaped and goes to the saws to be cut into rail lengths. The entire process is one of the most fascinating to watch in the whole steel mill.



The final manufacturing process in the story of the steel rail is shown here. After the rails leave the saws, they go to a cooling bed, where they remain until they have become cold. Then they are brought to these powerful presses, which straighten out the bends and kinks that they acquire as a result of being tossed about while red-hot. After the press operator is satisfied that they are straight, they are dragged off onto racks as you see, and they are then ready for inspection and shipment to the railroads.

iron against the 10 to 100 of the old forges—the substitution of coke from bituminous coal, in place of charcoal, as fuel.

Cast iron, wrought iron, and steel are all mixtures or combinations, in varying proportions, of iron and carbon. The differences among them might once have been very simply stated in this way:

Cast iron has a high percentage of carbon—usually about 2 to 3.5 per cent. It melts at a lower temperature and flows readily into molds, becoming brittle when cold. It is cast into stoves, radiators, and machine parts which do not have to withstand severe shocks and strains.

Wrought iron has had most of the carbon burned out, leaving not more than 0.3 per cent. It does not melt as readily as cast iron, and when heated it can be hammered into shape. It is tough and strong, though not so strong as steel; it welds easily and bends before it breaks. It has many industrial uses, as for chains, anchors, rivets, and bars; but its field is constantly being restricted by the increasing cheapness of steel.

The Sensitive "Temper" of Steel

Steel, until our own time, was iron containing less carbon than cast iron (not more than 2 per cent) and more carbon than wrought iron. Its distinguishing property, historically, is that it can be made hard and brittle or tough and malleable at will, by careful "tempering"; that is, by heating to a cherry-red, then suddenly cooling—in water, oil, air, or some special bath.

Now, all these definitions are still true of types of iron and steel, and may well be remembered as such; but the addition of new members to the cast-iron and steel groups has crisscrossed the family characteristics confusingly, and made necessary enlargements of the old definitions. A malleable cast iron is now produced by annealing. It resists battering and shock, is nearly as strong as mild steel, and, because of its cheapness, is much used in railroad car castings, reapers, binders, pipe fittings, etc. The Age of Steel was created by new steels which meet the old definition with difficulty or not at all; that is, by so-called mild and medium steels which contain so little carbon that they can never be made hard. In fact, the name of "steel" is now generally applied to any malleable iron obtained from the liquid state, regardless of the amount of carbon it contains. The ancient steel is thus relegated to a subordinate class as "high carbon steel."

A Great Field for the Chemist

We have spoken as yet only of iron and carbon, but many other elements—especially silicon, manganese, sulphur, and phosphorus—enter into our manufactured iron and steel. (The wonderful alloy steels are described under Alloys.) In steel and some irons a fraction of one per cent of a single ingredient may make or mar the product. The chemist who watches these points is therefore an important man in iron and steel making.

Not composition only, but also structure—metallography—affects the quality of iron and steel. Ordinary cast iron, for instance, is brittle because flakes of carbon in the form of graphite cut through the iron at all angles. Microscopic study has explained many, though not all, of the riddles of the structure of iron and steel.

Formerly wrought iron could not be made by using coal or coke as fuel, for they contain sulphur and the sulphur made the iron brittle. Yet today we are able to make wrought iron by a coke fire, thanks to the "puddling process," invented by Henry Cort in 1784. The secret is that the pig iron is melted and the excess carbon burned out in the hearth of a "reverberatory furnace," *without coming into contact with the fuel*, and hence without absorbing sulphur. The molten iron is stirred by the "puddler" until it forms into spongy balls; these are then worked and reworked to press out the dripping slag; and then, still hot, the puddle bars are run through iron rollers (the "rolling mill" also was Cort's invention), the process being repeated as often as necessary to give the grade of iron desired. In recent years the highly skilled "puddler" has been replaced by machinery in the puddling process.

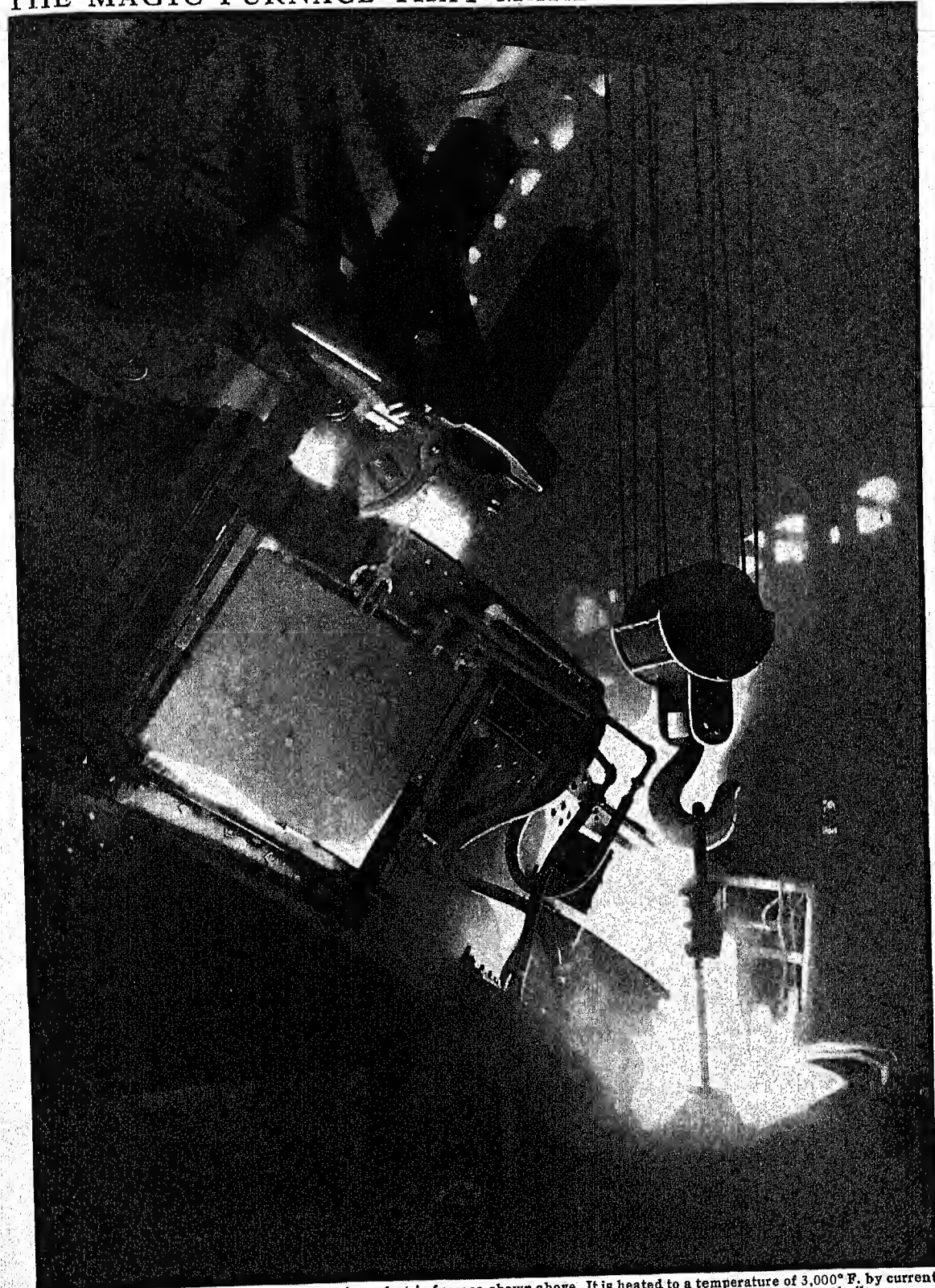
Steel was once made by packing bars of wrought iron on powdered charcoal, sealing them in a clay chest, keeping the whole red hot in a furnace for a week or ten days, then letting it cool for another week or so. This was the "cementation process," and a tremendously expensive process it is; its product was "spring steel" or "shear steel." Then in 1740 a Sheffield watchmaker produced an improved steel by melting cemented steel in a clay crucible. Ever since, the famous Sheffield steel for fine cutlery is made in that way; but American makers of crucible steel carburize and melt in one operation, by melting puddled or charcoal iron in a graphite crucible with charcoal. So long, however, as steel was made only in crucibles, its use in large quantities for steel ships and skyscrapers was impossible.

Kelly, Bessemer, and Modern Steel Making

About 1847 an American named William Kelly noticed that a draft of air striking the molten iron in his Kentucky iron works made the metal seethe and boil. Why did cold air heat instead of chilling the metal? He remembered that the molten iron still contains carbon and other combustible material, and guessed that the oxygen of the air captured and carried away the excess carbon—in other words, that it boiled by burning its own fuel.

This was the beginning of modern steel-making. A few years later an Englishman, Sir Henry Bessemer, observed the same thing, and independently worked out the "fuel-less" process which he patented in Great Britain in 1855. Bessemer has reaped most of the fame from the discovery, but Kelly was granted a patent in the United States, and it is now generally recognized that the two inventors stumbled on the same discovery.

THE MAGIC FURNACE THAT MAKES OUR NEW STEELS



Miracles in metal are performed by the modern electric furnace shown above. It is heated to a temperature of 3,000° F. by current passing through huge electrodes in the furnace roof. This furnace is especially valuable in producing fine steel alloys.

The original *acid* Bessemer process, in which the converter is lined with silica, does not remove phosphorus from iron. Since more than 0.1 per cent of phosphorus makes steel brittle, the acid Bessemer process could not be applied to pig iron derived from high-phosphorus ores like those of Lorraine. But in 1878, only seven years after Germany first annexed Alsace-Lorraine, this problem was solved in England by Sidney G. Thomas and Percy G. Gilchrist. Their new method, the *basic* Bessemer process, employed a basic (alkaline) material, such as burned limestone, in both the converter and the charge, to absorb the phosphorus. By applying this process to its Lorraine ores, Germany soon became a leading manufacturer of iron and steel.

The Open-Hearth Process

Meanwhile, the next great advance in steel-making was the "open-hearth" process, developed in England by Sir William Siemens in 1856 and improved in France in 1864 by Emile and Pierre Martin. At first this process too used only the acid method, but developed the basic type in 1884. In the open-hearth process, molten iron is poured into a reverberatory furnace—one in which the flame is deflected down upon the charge from above. The flame is a burning mixture of gas and air. Its high temperature (2,800° to 3,100° F.) is obtained by preheating the gas and air by an ingenious "regenerative" method. The gas and air enter through a set of chambers at one end of the furnace, and the hot exhaust fumes go out through similar chambers at the other end. Every 15 or 20 minutes the direction of flow is reversed, so that the incoming gas and air now enter through the chambers previously heated by the exhaust. Thus the temperature rises steadily until the charge is tapped.

The bulk of the world's steel is made by the open-hearth and Bessemer processes. An open-hearth requires about 12 hours to produce 125 tons of steel, the usual charge. A Bessemer converter makes about 25 tons in one "blow" of about 15 minutes. It is also the cheaper process. But open-hearth steel is purer and its characteristics can be tested and modified during the "heat," or "melt"—a great advantage when making steel for a variety of uses. In the United States most steel is made by the basic open-hearth method. Since the first World War, fine alloy steels have been increasingly made with the electric furnace, a process developed early in the 20th century. This provides the highest temperature and closest control, but it is costly.

The Work of the Rolling Mill

Henry Cort's rolling mill has become even more important in connection with the manufacture of cheap steels than with the wrought iron for which it was invented; it has, indeed, produced a specialized and subdivided industry. Some rolling mills make semi-finished products—"blooms," slabs, billets, and bars—to be worked up elsewhere; others make finished steel products, such as rods, bands, structural beams, railway rails, plates, wheels, and axles.

Many interesting features of the iron and steel industry must go unmentioned here for lack of space; but one important piece of machinery, the steam-hammer, must be noticed. The early power hammers, invented to do the work formerly done by hand forging, required great labor and constant attention. The novel advantages of James Nasmyth's steam-hammer, invented in 1839, are automatic working and perfect control. The hammer-head or tup is raised by steam; when the steam is cut off, the tup falls; and so exquisitely is the device regulated that a mammoth hammer which could pulverize a granite boulder with a single blow can also break an eggshell without chipping the egg cup which contains it. The largest steam-hammer ever built, with a huge tup weighing 125 tons, was set up at the Bethlehem Iron Works in 1891 for use in forging armor plate. It has since been torn down and replaced by a new invention—the hydraulic press. While small steam-hammers are still extensively used, hydraulic presses are usually employed for forging large pieces.

Iron ore is so heavy to transport that one would naturally expect to find iron and steel manufacture flourishing near the mines. But actually many other factors control the industry and more frequently iron manufacture is located near the source of fuel supply. In the United States the Great Lakes provide cheap transportation from the iron regions of the north, so that the big mills can be located not only near the coal fields, but also near the markets where the finished products are sold.

The United States the Leader in the Iron Industry

Great Britain rose to leadership in the iron industry on the crest of the Industrial Revolution in the 18th century. About 1880 British production of iron and steel was overtaken and passed by the United States which also has great supplies of coal and larger supplies of iron ore. At present the United States is the greatest steel-manufacturing country, with Pennsylvania, Ohio, Alabama, Illinois, Indiana, Michigan, and New York in the lead. The formation in 1900 of the United States Steel Corporation, with the Carnegie Steel Company as its nucleus—which owned the finest steel-producing plant in the United States and the world, and also had the most complete control of raw materials and transportation—gave that corporation control of about two-thirds of the country's total steel output. It possessed 149 steel works of various kinds, with a collective capacity of nearly 8,000,000 tons of finished steel a year; 78 blast furnaces, capable of an annual production of more than 7,000,000 tons of pig iron; more than 50,000 acres of coking coal lands; more than 1,000 miles of railroad, more than 100 freight vessels on the Great Lakes; an ocean steamship line; besides great ore docks, natural gas and limestone properties, etc. Its capitalization (on paper \$1,404,000,000) was said to represent nearly half of all the money in the United States. For such a giant corporation to found a city (Gary, Ind., in 1905-1906) was a mere incident.

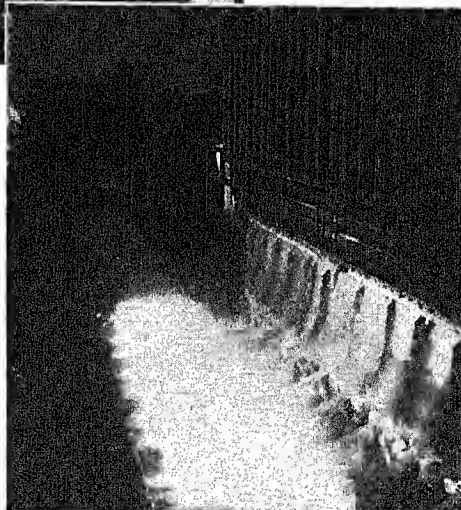
Now let us review the processes by which iron and steel are made into everyday forms. First, iron ore is reduced to molten iron in the blast furnace, making pig iron, which is melted in a furnace to produce iron castings. Pig iron processed in a Bessemer converter makes Bessemer steel, or when purified in an open-hearth furnace, it becomes open-hearth steel, which may be either "acid" or "basic."

Acid steel is made in furnaces with a highly siliceous lining which produces an acid slag. The steel resulting is excellent, but as the process removes neither sulphur nor phosphorus, the materials and fuel must be carefully chosen. For basic steel a dolomite lining, or one of some other basic material, is used, and the addition of suitable fluxes to the molten metal helps eliminate the sulphur and phosphorus.

Either Bessemer or open-hearth steel is cast into metal molds, usually about 19 inches square and 6 feet long, making ingots. Ingots are rolled into "blooms," which in turn are rolled either into rails or structural shapes. Ingots are also rolled into slabs, which are rolled into plates, or into sheet bars, to be rolled into sheets. Many pressed metal objects are made from sheets. Black sheets are cleaned and coated with zinc, making galvanized sheets, which resist rust and are used extensively for roofing and for containers. Black sheets may also be cleaned, cold rolled, and coated with tin, making tin plate for the canning industry.

Again, ingots are often rolled into "billets," which are rolled into bars and small shapes, or into steel "skelp," which is bent into tubes and welded, making steel pipe. Billets may also be pierced, rolled, and drawn through dies, making seamless tubes. Many billets are rolled into rods, which are drawn through dies into wire, and the wire formed into nails or woven into fencing (see Wire). Some rods are "headed" into rivets and bolts, or welded into chain.

ROLLING ENDLESS SHEETS OF STEEL



Sheet steel, once limited in length, is now rolled continuously. Above, a conveyor starts a white-hot 11,000-pound slab toward the furnace in the foreground. Below, the great slab begins its trip through the many flattening rolls.

The United States has normally produced between 42 and 56 million tons of steel and between 35 and 45 million tons of pig iron a year. But beginning in 1941, under the impetus of demands for ships, airplanes, tanks, and other materials of war, it increased production until the rate was about double the old normal figure. This expansion was achieved by using

existing facilities to nearly 100 per cent of their rated capacity and by building new plants in important centers.

Recent Developments in the Industry

Blast furnaces of 600 tons' daily capacity are being rebuilt to produce 1,200 tons. Modern open-hearth design calls for 100 to 125 tons output in a single heat. Rolling mills are being driven by huge electric motors that develop many thousands of horse-power each. Engineers are seeking speedier and speedier machinery. In this respect, one of the outstanding new developments is the continuous rolling of sheets, whereby production is more than doubled and the cost lowered. In this method flat bars of steel are fed from a furnace through a series of roll stands at a speed which increases as the rolls progress. "Edgers" placed at the sides of some of the rolls keep the edges of the sheets straight and parallel. The finished sheet, which may be as wide as 48 inches, is cooled and cut into suitable

lengths for shipment. If very thin sheets and special finishes are desired, the sheets are commonly rolled cold. This continuous process has increased the capacity of America's mills far beyond the ordinary demand, but new uses for sheet steel may result. Sheet steel is being experimentally used as a road base.

The capacity of plants making alloy steels has more than trebled in the last few years, and "stainless steel" and "rustless iron,"

forms of alloy steel, are taking important places in commerce. Stainless steel is used extensively for cutlery. It resists corrosion and appears valuable in resisting heat. Bridges and general construction may some day be built from alloys of this type. Some automobile manufacturers use rustless iron for hub caps, lamp shells, and

radiators. It takes a high polish and does not stain.

New uses for iron and steel are being found constantly. Natural gas is being pumped through 24-inch steel pipe for distances of over 1,000 miles. Oil pipe lines extend from western Texas to the Atlantic seaboard. New steel skeleton buildings reach up 1,000 feet or more. Residences are being built with steel framework, and it is proposed to use steel floors where loads are heavy and fireproofing is important. The farmer is turning from the horse-drawn, single-share plow to the multiple plow drawn by a powerful tractor. He is adopting modern harvesting machinery made possible by special steels. Our concrete highways are reinforced with steel mesh and steel bars. From 10 to 20 tons of steel go into each mile of concrete road.

Years ago, welding one piece of steel to another was a job for a blacksmith. Now fusion welding methods are used extensively. This is accomplished either by an electric arc, or by an oxy-acetylene flame. Building frames are welded instead of being bolted or riveted. Ship hulls are welded, and not only are thousands of miles of large-diameter pipe made by the welding process, but even the joints are welded in the field by means of portable apparatus. (See Welding.)

Another important development is the case-hardening of steel, particularly of smaller tools and machine parts, in a nitrogen-yielding gas, usually supplied by ammonia. This method is called the nitriding process. Carburizing, or obtaining a surface penetration of carbon, also produces a surface that is extremely hard and very resistant to wear.

Let us see what the steel mills made in one recent year. They rolled nearly 3,000,000 tons of rails; over 12,000,000 tons of plates and sheets; 3,000,000 tons of rods; nearly 5,000,000 tons of structural shapes; over 6,000,000 tons of merchant bars; 950,000 tons of bars for reinforced concrete buildings, bridges, and roads; over 3,000,000 tons of skelp for pipe; 2,500,000 tons of hot rolled strips or flats for cold rolling; and numerous other products in quantities that ranged upward to above 500,000 tons each.

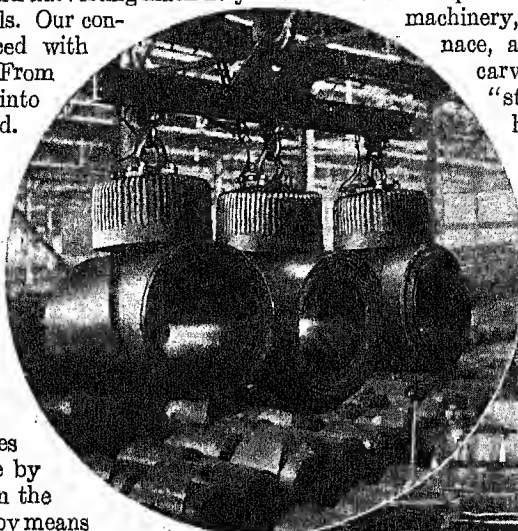
The Great Steel-Using Industries

It is interesting to know what was made of all this steel. About 20 per cent went into the manufacture of motor vehicles; building and construction work accounted for 12 per cent; makers of cans and other metal containers took 11 per cent; the railroads used 10 per cent for new rails, cars, locomotives, and bridges; oil, gas, water, and mining industries took 6 per cent; agriculture consumed over 5 per cent; machinery and tools, 4 per cent; and roads, nearly 3 per cent.

We find iron and steel products everywhere. Elevated water tanks are often made of steel plates. The supports for these tanks, and for steel buildings, bridges, and the frames of freight cars, are made of structural shapes. We find bars in so-called iron fences and in ornamental steel work. Hairpins and fences are made of steel wire, as are nails and staples. Automobile fenders are made of cold rolled strips, and the frames of hot rolled strips. Automobile bodies and steel furniture are made of black sheets, and the hot-water tank of galvanized sheets. The fruit canner uses tin plate. The legs on most pieces of

machinery, and the doors on your furnace, are made of cast iron. Your carving knife may be marked "stainless steel," and you may have some kitchen utensils made of rustless iron. Drain pipes are made of cast iron; water pipes may be plain black wrought steel, or they may be coated with zinc.

ROLLS AND SHEETS OF STEEL



An automatic coiler rolls continuous sheet steel into the coils you see in the top picture. Those great magnets move the coils to an automatic decoller, and shears cut the sheets to any size desired. Below are sheets of many sizes, ready for the market.

Steel scrap is used with pig iron in making nearly all our new steel. This is done to save both time and ore. The scrap contains less carbon than the pig iron, and therefore shortens the process of bringing the "melt" to the low carbon content required for steel. With the use of scrap, less pig iron and fewer blast furnaces to make it are needed. This means a great saving in coke and limestone as well as ore.

Much of the scrap needed for this saving consists of the shavings and cuttings accumulated at the mills themselves during the fabrication of steel products. The rest is bought from scrap dealers, who in turn buy it from small manufacturing plants and from junk dealers. Though popularly called "scrap iron," the best market scrap is all steel, with the cast-iron scrap sorted out and sold separately at a lower price.

IRON MASK, MAN IN THE. In the gloomy Bastille of Paris, in the days of Louis XIV of France, there dwelt a mysterious prisoner known as "The Man in the Iron Mask." Who he was and why he was imprisoned, few knew then, and no one knows today. No one was permitted to look upon his face, for it was always covered with a mask, not of iron, but of black velvet. All we really know of this silent figure is that he had been brought to the Bastille in 1698 from another prison, that he died in 1703, and that his name was recorded as Marchiel—but that was undoubtedly a false name.

Many theories have been advanced as to who the Man in the Iron Mask was. One is that he was Mat-thioli, the chief minister of the Duke of Mantua. This minister, in return for a large bribe, had promised Louis XIV to betray to him an important frontier fortress belonging to his master. He failed to keep his promise, however, and so Louis had him seized and imprisoned in France for the rest of his life. There are many other theories as to his identity. One of the earliest and most persistent and least credible is that he was a brother of Louis XIV. (See Louis, Kings of France.)

Making DESERT and SWAMP Blossom as the ROSE

*How Lands that Have Too Much Water or Too Little are Brought under Cultivation—
—Irrigation in the Past and the Wonders It is Working in Our Own Day—*

Vast Areas Still Awaiting Reclamation

IRRIGATION AND RECLAMATION. The early settlers of America had a wonderful choice of rich farm-land in a great undeveloped country. As time passed, the best lands along the Atlantic Coast were taken up and settlers gradually spread through the rich lands of the Mississippi valley, stopping only at the edge of what was erroneously called the Great American desert. The gold rush lured adventurers out across the plains, and others followed to settle on the farmlands of the far West. Soldiers returning from the Civil War sang "Uncle Sam is rich enough to give us all a farm," and this was true at that time.

Even today the United States still has a vast area of idle lands—almost 200,000,000 acres, not counting Alaska, but most of this has to be irrigated or drained or otherwise made suitable for agriculture. A large part of the idle land is very rich, but it is not available for immediate cultivation because it is stump land or cut-over land, or it is swamp land too wet to bear the plow, or it is in regions of insufficient rainfall. Much has already been done toward the reclamation of such lands.

When settlers turn to the cut-over lands, which formerly were forest, they must chop the roots and pull the stumps out with horses, or blow them out

with dynamite. Stump-pullers of various types are also used. Thus these lands, rich with the humus left by forests, can be put to work.

Inland swamps can be reclaimed by ditching and

tiling, and sea-coast areas that are under water at high tide by dams and dikes. In this way very rich farm-lands can be created. The thrifty Hollanders have turned the marshes of their low-lying country into the most fertile farm districts of Europe by an extensive system of dikes and canals. These reclaimed districts, called "polders," are drained by a network of ditches, from which the ever-accumulating

THE EGYPTIAN'S BUCKET WHEEL



Thousands of years ago the ancient Egyptians were watering their farms by methods very little different from those in use along the Nile today. This, for example, is a crude "bucket and wheel" arrangement for pouring water little by little on the thirsty soil.

water is pumped into canals emptying into the sea. Thousands of windmills and steam and electric pumps are continuously engaged in this work. In the case of Haarlem Lake, three steam engines, capable of pumping 1,000,000 tons of water in 24 hours, were kept at work for four years to pump out the waters of the lake. Cultivation of the lake bed was then begun, but the pumps are still operated to keep pace with the seepage of water. Even this accomplishment is small compared with the work begun in 1920 to reclaim the Zuider Zee, which is ten times larger than Lake Haarlem. It is estimated this work will occupy more than 30 years.

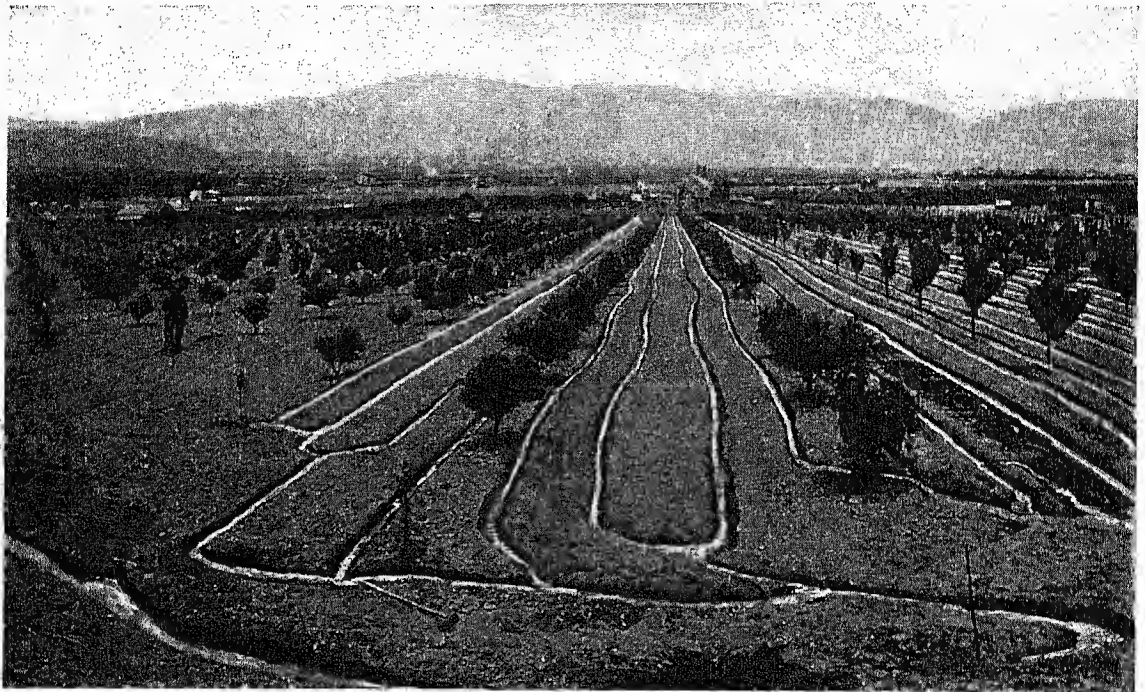
It is said that there are from 60 to 80 million acres of swamp lands in the United States. The largest areas are in the lower valley and delta of the Mississippi River, the swamp tide-lands of the Atlantic coast, the Everglades of Florida, and in low-lands bordering on the Great Lakes. In Illinois, Minnesota, and other portions of the country a considerable area has been drained by individual or local effort. Sometimes open ditches lead off the excess water, and drains of tile or cement laid below the top layer of the soil supplement the work.

lands. In India, water in leather sacks, each holding as much as 30 gallons, is drawn from wells by bullocks and emptied through ditches over cultivated ground. Today Egypt and India also are served by the greatest modern irrigation systems in the world.

Irrigation in India and Egypt

For decades British engineers have been developing a program to irrigate some 50 million acres in India, by harnessing the heavy monsoon rainfall which drains from the Himalayas and the Western Ghats. Northwest India, including the Punjab, is served by the

THE "RIVER SYSTEM" OF AN IRRIGATED ORCHARD



In distributing water by the method used in this Washington orchard, advantage is taken of the general slope of the country. If a stream from those distant mountains, for instance, enters the valley, a canal is cut near its point of entrance, and water is diverted along the upper slopes of the valley. From this canal ditches are taken out to the orchards below, and these ditches in turn feed the smaller ditches you see here sloping back toward the river bed.

Drainage work has been done by corporations, districts, and states, as well as by individual effort. In Louisiana levees have been built to guard against the flooding of the delta lands, and much important work has been done near New Orleans. Drainage has been carried out in Florida in the Everglades region, in Minnesota and North Dakota in the upper valley of Red River, in Indiana in the Kankakee marshes, and in California in the lower Sacramento Valley. Various other swamp areas have been surveyed for government reclamation.

In other waste areas, nature has gone to the other extreme, leaving large tracts of land without sufficient rainfall to grow vegetation of value. Irrigation of arid areas was first undertaken many thousand years ago—in Egypt, Assyria, Babylonia, India, and China. The Egyptians still use buckets at the end of well-sweeps to raise water from the Nile to water adjacent

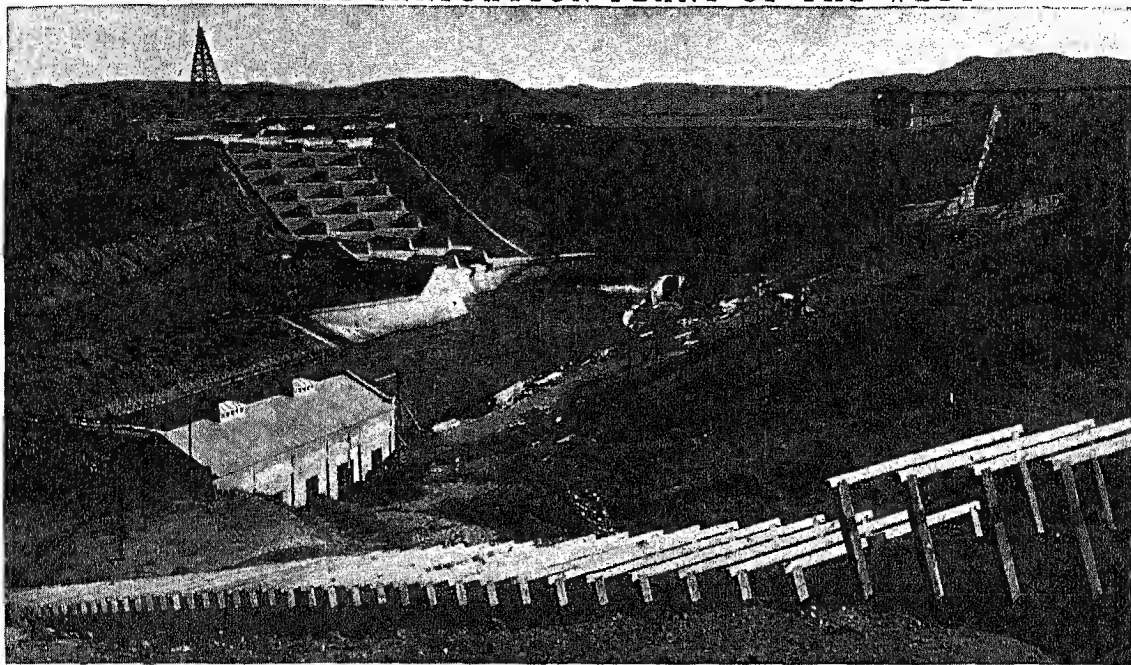
Sukkur dam, 41,725 feet long, across the lower Indus, and by four weirs across the Sutlej River. These projects, respectively, can irrigate nearly 6 million acres and about 5 million acres. The Cauvery, Bhavani, Tangabhadra, and Kistna rivers draining east across Madras are being made into storage reservoirs. A canal from the Sarda River serves Oudh; and two huge masonry dams will store water for the Deccan.

Egyptian irrigation depends entirely upon the Nile, and is controlled largely by the Assuan dam. This dam stores surplus water for release during the dry season (see Egypt). Some 5 million acres are served.

Irrigation in the United States

The Pueblo Indians of New Mexico and Arizona practised irrigation before white men reached America; and the early Spaniards irrigated the land in Mexico and in the region which now comprises the southwestern part of the United States. Much work also has

A TYPICAL IRRIGATION PLANT OF THE WEST



This is the Lahontan Dam of the Truckee-Carson irrigation system in Nevada. In the background you see the dam and the reservoir. The "stairways" on the right and left are spillways for letting the water go on about its business after the reservoir has been filled. The "stilling pool" below the dam is to catch the rush of overflow from the spillways in times of floods, and still the waters so they will not rush down too violently and destroy the river banks. Such great dams as these conserve the waters of the spring floods against the dry summer season, when they are released to supply hundreds of irrigation ditches below the dam. The pressure of the water is used to generate electricity in that power house at the left.

been done in the irrigation of small areas by individual effort, and by associations of farmers uniting to furnish pumps and construct ditches to conduct water to their fields or orchards. Some of the ditches on the old irrigation projects of the earliest settlers are still in use.

By the National Reclamation Act passed by Congress in 1902, the construction of projects too large for individual enterprise has been put under way. This act provides that a large portion of the funds secured by the sale of public lands in 16 states shall be used to construct dams, reservoirs, and ditches for the irrigation of land in these states. The states included are Arizona, California, Colorado, New Mexico, North Dakota, Oklahoma, Idaho, Kansas, Montana, Nebraska, Nevada, Oregon, South Dakota, Utah, Washington, and Wyoming. The work is in charge of the Reclamation Bureau of the Department of the Interior. Millions of acres of desert land have already been reclaimed, providing homes for many thousands of the country's farm population.

One of the largest of these undertakings is known as the Salt River project, embracing more than 200,000 acres in the neighborhood of Phoenix, the capital of Arizona. Here the great Roosevelt Dam was built to store the waters of the Salt River. Not many miles away, in the extreme southwest corner of that state, is another interesting undertaking, the Yuma project, supplying about 100,000 acres in Arizona and California.

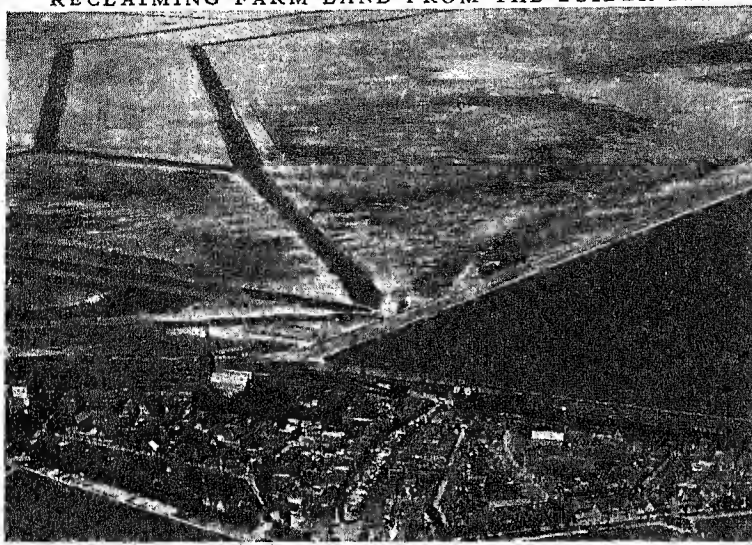
On the Boise project in Idaho is the great Arrow-rook Dam, one of the highest in the world, forming a reservoir capable of storing water to irrigate 300,000 acres. The North Platte project in Nebraska and Wyoming has an irrigable area of nearly 250,000 acres. The Elephant Butte Dam on the Rio Grande in New Mexico forms one of the largest artificial lakes for irrigation in the world. This dam provides irrigation for 180,000 acres of arid land in New Mexico, Texas, and Mexico. Other important government irrigation plans are the Shoshone project in Wyoming, the Belle Fourche in South Dakota, the Milk River in Montana, the Uncompahgre and Grand Valley in Colorado, the Strawberry Valley in Utah, the Umatilla and Klamath in Oregon, Owyhee in Oregon and Idaho, and the Yakima in Washington.

As a result of these and other federal irrigation systems, crops worth \$160,000,000 or more are produced each year from land that only recently yielded virtually nothing. Including all irrigation enterprises, federal and private, the United States has about 27,000,000 acres under irrigation. (For map of areas where irrigation is necessary, see Drought.) These irrigated lands have brought prosperity to thousands of people on farms and in the neighboring towns.

Irrigated lands also have advantages of their own. Whereas rainfall sometimes fails when it is most needed and is too profuse at other times, it is possible with an adequate irrigation system to apply water to growing crops at just the time and in just the quantity

needed. Then, too, more rain means less sunshine; in the arid regions there are more sunshiny days, and this makes for better and more rapid development of crops. Still another advantage lies in the fact that the soils of the arid regions have generally not been robbed of their mineral plant foods as have those in the humid, or moist, regions.

RECLAIMING FARM LAND FROM THE ZUIDER ZEE



Not so many years ago, the Zuider Zee lapped all along one side of the little town of Medemblik, held back by the curving dike seen here at the far side of the town. The water covered all the land shown in the background. Then engineers built a huge dike at right angles to the old dike; the water behind it was pumped out; and thus an extensive polder of reclaimed land was added to the Netherlands. Since this tract of land is still below sea level, water continues to seep in from beneath the dike; but a system of great ditches drains this water to pumping stations, such as the Ley station, seen here where the canals converge in the center of the picture. These stations return the water to the sea.

On the one-time desert lands of Arizona and California as many as five crops of alfalfa can be cut in a year. The long staple Egyptian cotton, like that grown in the Nile valley, growing more than six feet tall and worth twice as much as the short staple cotton, flourishes in this hot country; and such fruits as dates, figs, oranges, grapefruit, and grapes are grown where only the cactus grew before. In general, according to United States government estimates, the average yield of agricultural crops on irrigation projects is just about double the average yield on non-irrigated lands in the country at large. In addition to the government projects, irrigation is carried on in various parts of the country by private companies. In California the famous orchards of the southern part of the Sacramento and of the San Joaquin valleys depend largely on irrigation through private enterprises.

In Canada the greatest irrigation project is that of the Canadian Pacific Railway in Alberta, designed to supply water to about 400,000 acres of land.

The Settler and the Irrigated Lands

Settlement on government reclaimed lands is regulated under the Reclamation Act. Land held by one individual is limited to from 10 to 160 acres.

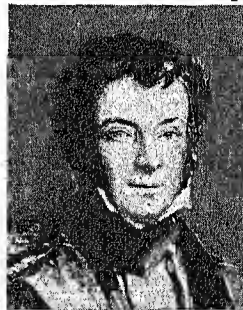
The settler is required to work the lands and to pay to the government, in not to exceed ten yearly instalments, his proper proportion of the cost of constructing the irrigation system. After a project is well under way and the community of settlers well established, provision may be made for taking over the ownership and operation of the project by local interests. This releases the government funds for use on the newer projects.

Lands are irrigated in the United States at an average cost of about \$50 per acre, and the cost of keeping up the system may average from \$1 to \$2 an acre. With intelligent farming a profit can be obtained comparing favorably with other farm lands, for there is no danger of crop failure from drought. Water for irrigation is distributed through a main ditch leading directly from the source of supply. From this ditch run various arteries, known as headers, to the area to be watered. A gate at the intake of the main ditch and gates at the headers control the flow. Crops which require flooding are served by damming the headers at various points, causing an overflow. Canvases or earth dams are commonly used for this purpose. Where crops are planted in rows, as in orchards, water is carried between

them in small furrows which are kept filled as long as is necessary. (See also *Lands, Public*.)

IRVING, WASHINGTON (1783-1859). Essayist, historian, and writer of stories, Irving was the first of the great American writers. Before his time Europe had regarded American authors chiefly as curiosities. But it was quick to recognize the worth of this new writer, so graceful was his style, so fascinating and delicate his humor, and so genial and kindly his manner.

Irving was born in New York City, then a town of about 25,000 inhabitants, part of whom were Dutch and part English; and it was from this New York that he drew much of the material for his stories and sketches. Never a very strong child, he spent more time with dog and gun, rambling about the country regions which he later described, than he did in school. Sometimes, too, he wandered into the Dutch part of the city and listened to the quaint stories told by the



WASHINGTON IRVING
Historian and Story Writer

THE SMOKERS' REBELLION IN FULL BLAST



One of the innumerable funny stories in 'Knickerbocker's History of New York' tells how Wilhelmus Kieft, one of the Dutch governors of New York, thinking people talked politics too much and that smoking was the cause of it, issued an edict prohibiting the practice. Whereupon the smokers, with those long pipes and plenty of tobacco, gathered before the Governor's house and—well, you can see for yourself! The rebels won. They "smoked him out"! The picture is from a painting by the distinguished American artist, George H. Boughton.

Dutch descendants. At home he read a great deal in his father's large library. He was always cheerful, kindly, and sweet-natured, though a great part of his life was a struggle against ill health, grief, and uncongenial work; for the day had not yet come when an American author could hope to support himself by his writing alone.

Irving began the study of law, but his already delicate health was still further impaired by grief over the death of his fiancée. His family, therefore, sent him abroad, where he traveled in England, Holland, France, and Italy. When he returned, he wrote a humorous miscellany entitled 'Salmagundi', and a little later appeared his burlesque 'History of New York' from the Beginning of the World to the End of the Dutch Dynasty, supposed to have been written by "Diedrich Knickerbocker." Irving soon went abroad again on business for his brothers, and this time he met many famous writers in England and gained new inspiration. He now set about writing in earnest. The first book he put out after this was 'The Sketch Book', for which through the influence of Sir Walter Scott an English publisher paid him \$2,000. Irving remained abroad for many years traveling, writing, and in the diplomatic service of his country. While minister to Spain (1842) he became interested in Spanish history, and his studies there furnished his lively imagination with plenty

of material for 'The Alhambra' and his life of Columbus. The last thirteen years of his life he spent at his home near Tarrytown on the Hudson, a region his pen has made famous. He is buried in Sleepy Hollow Cemetery, near the road where Ichabod Crane fled from the headless horseman.

'The Sketch Book' is the best and most widely known of Irving's works. It contains the stories and sketches everybody reads—'Rip van Winkle' and 'The Legend of Sleepy Hollow'—in which Irving used the legends the descendants of the old Dutch settlers had told him, the mysterious tale of the return of Hendrick Hudson and his men, and the ghost story concerning the headless horseman. One feels the very atmosphere of the sleepy prosperous country, and its quiet prosperous folk. Other charming sketches are the essays on Westminster Abbey and on the Shakespeare country. 'The Alhambra', named for the old Moorish palace in Spain, contains beautiful descriptions and tales of captive princesses and talking doves, of magicians and knights and peasants.

Irving's chief works are: *Sketches, Essays, and Tales*—'Knickerbocker's History of New York' (1809); 'Sketch Book' (1819); 'Bracebridge Hall' (1822); 'Tales of a Traveller' (1824); 'The Alhambra' (1832); 'Wolfert's Roost' (1855). *Histories and Biographies*—'The Life and Voyages of Columbus' (1828); 'The Chronicle of the Conquest of Granada' (1829); 'The Life of Mahomet' (1849); 'The Life of Goldsmith' (1849); 'The Life of Washington' (1855-59).

ISABELLA OF CASTILE (1451-1504). It was the happy fortune of Queen Isabella of Castile and Leon to give to Europe a new nation and to the world a new continent. The first service came through her marriage in 1469, while queen of Castile and Leon, to King Ferdinand of the neighboring and rival Spanish kingdom of Aragon, thus uniting the two chief kingdoms in the Spanish peninsula. Her second claim to fame came through her support of Columbus.

Isabella was a woman of remarkable energy and talent, beautiful and possessed of winning grace, although at times proud and ambitious. She was always present at state meetings, and her name was placed with that of Ferdinand at the end of all official documents. Her part in the founding of a national Spanish inquisition under royal control, with its persecution of the Moors and Jews, shows the intolerance in religious matters which she shared with her husband and her times.

History relates that Columbus, when he applied at the court of Spain for help in his projected voyage of discovery, failed to receive the sanction or aid of

Ferdinand and the learned council. Columbus, discouraged, was about to leave for France, when he succeeded in interesting Isabella in his plan. The king remained indifferent and pleaded want of funds. The queen, so the story runs, in her earnestness exclaimed: "I pledge my jewels to raise the money." Columbus succeeded at last, and to Isabella belongs the honor; for even though the story of the jewels has no basis but legend, it is true that Isabella's interest and support made possible Columbus' voyage.

ISIS (i'sis). The "queen of the gods" in Egyptian mythology was Isis, the sister and wife of Osiris. She represented the moon as Osiris did the sun, and was believed to have taught agriculture to the Egyptians. The old legends tell of her lament for her slain husband, and it was said that her tears caused the overflow of the Nile. She is frequently pictured with her infant son Horus. The cow was sacred to her and she is often represented with the horns of this animal. The worship of Isis was introduced into Greece about the third century B.C. and later became very popular in Rome. (See Osiris.)

ISTANBUL—Gateway Between EAST and WEST

ISTANBUL. No city in the world occupies a more strategic position than Istanbul, formerly called Constantinople. It commands the narrow gateway between the Black Sea and the Mediterranean. Along its waterfront must pass all the southbound cargoes from European Russia and from the Danube Valley. Here too is the ferry crossing for rail-borne traffic between Europe and the Near East. The Bosphorus—that narrow strait where Europe and Asia face each other—is little more than a mile wide at this point. To the south lies the Sea of Marmara, and 160 miles away the Dardanelles open out into Mediterranean waters (see Black Sea; Bosphorus; Dardanelles).

From 1453 to 1923 Istanbul was the capital of the Turkish Empire, and before that of the Byzantine Empire (see Turkey; Byzantine Empire). After the decline of Turkish might in the 19th century, the Turks were permitted to remain in possession of this strategic location because none of the European powers was willing to see it pass into the hands of a strong rival. But its critical position remained a constant threat to its security. When Kemal Atatürk set about forming a modern nationalist Turkish state, he moved his capital to Ankara, on the highlands of Asiatic Turkey.

Ancient History

There has been a settlement on the site of Istanbul since pre-historic times. The five-mile long inlet from the Bosphorus, now called the Golden Horn, provided an attractive safe harbor. About 667 B.C. seafaring Greek colo-

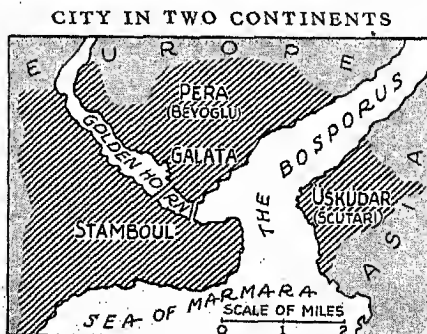
nists from Megara took possession of the place and called it Byzantium. Nearly a thousand years later, the Romans under Constantine the Great captured the city, enlarged and beautified it, and strengthened its fortifications. In A.D. 330 Constantine gave it his name and made it the capital of his empire. It continued as the capital of the Eastern Roman Empire (Byzantine Empire) until the Ottoman Turks captured it in 1453. They transformed it into a fabulously rich and colorful Mohammedan city, drawing its wealth from the trade that passed through its gates.

Travelers can trace the course of 30 centuries of history in its relics and monuments. Many gems of architecture have been turned into museums of Byzantine and Ottoman art. Among them are Santa Sophia, which was a Christian church for nine centuries and a Mohammedan mosque for nearly five, and the domed mosque of Sultan Achmet (see Architecture). The former war offices house the National University of Istanbul. Along the Bosphorus, Istanbul

American College, formed by the union of Robert College and the American College for Girls, stands neighbor to the 15th-century fortress of Rumeil Hissar.

The city today is important as a port and trading center. Its industries include cement, tobacco, and munitions factories, shipyards, and automobile assembling plants. Rugs and embroideries are made by hand.

Istanbul is divided into a number of separate communities. Old Stamboul, the original city



This shows Istanbul's strategic location. Uskudar, in Asia, Stamboul, Galata, and Pera, in Europe, are all under one city government.

THE MAGNIFICENT HARBOR ON THE "GOLDEN HORN"



From Galata, Istanbul's business section, this pontoon bridge carries traffic south across the busy harbor waters of the Golden Horn to old Stamboul, whose mosques and minarets recall its many centuries as the capital of the powerful Ottoman Empire.

site, lies south of the curving Golden Horn. To the north of the Horn, Galata is the business section and Pera is the foreign residential quarter. Üsküdar and

its suburbs, across the Bosphorus, form a shipping terminus and textile manufacturing center. Population (1940 census), 790,000.

The Sonorous ITALIAN TONGUE, Beloved of Poets

ITALIAN LITERATURE. The Italian language is a daughter in the direct royal line from ancient Latin, and resembles her the most of all the Latin descendants. The sonority and rhythm which French has lost, the delightful clearness which has become a bit blurred in Spanish, all remain in melodious Italian, the ideal language of poetry, in which it has always excelled.



DANTE

Yet modern Italian, being to a large extent a forced bloom, suffers in many respects from its artificial growth. For in the Middle Ages, while literary Latin of a sort continued to be used as the learned and cultured language, the mass of the people of Italy, mingling the old Low Latin of popular speech with imported foreign elements, contrived to swing it into a score of different dialects. Then came the great Dante, who selected the dialect of Tuscany for his literary work, and revealed its strength and beauty in his epic masterpiece 'The Divine Comedy'. Petrarch and Boccaccio followed him, and wrote immortal lines in Tuscan—epic verse especially in the one case and prose stories in the other. Thus this dialect became the fixed literary language of Italy, and is today so recognized.

But the many other dialects still exist, and their words tend to creep in, not always elegant or well conceived; and it is here that the struggle between the classic but often cramped Tuscan and the cruder, but more vigorous popular dialects places the Italian writer at a loss. This artificiality and limitation of Italian, in spite of its rich sweetness, is therefore to be reckoned with in explaining why Italian writers of all times, and especially at present, are not as numerous as in other countries. But it has with equal truth been said that "Italian writers must be weighed, not counted." If they have been few, they have also been very great.



PETRARCH

Latin long remained in Italy more nearly a living tongue than elsewhere, and hence a written literature in the vernacular or people's language was slow in arising. Indeed, it was not until the last half of the 13th century, when the amazing figure of Dante emerged, that any truly Italian literature appeared.

Late as it was in starting, this literature attained its greatest glory almost immediately, far outshining all other literatures of the period. Dante (1265–1321) wrote his 'Divine Comedy' a century before Chaucer and three centuries before Shakespeare.

Petrarch (1304-1374) followed with his immortal sonnets to "golden haired" Laura, and Boccaccio (1313-1375) with his famous collection of prose stories entitled 'Decameron'.



BOCCACCIO

But with the great revival of interest in the ancient Greek and Latin literatures, which was also a feature of the Renaissance, the new Italian literature declined. The brightest spirits sought their inspiration in antiquity and the newly formed Italian tongue suffered through an affected

and elaborate striving for Latin elegance.

It was not until the 16th century that Italian writers returned to a natural and spontaneous style.

This century has been called the "golden age of Italian literature," not because it produced men of supreme greatness, but because of the large number of pleasing and competent writers who appeared. The best known of those are Ludovico Ariosto, whose masterpiece 'Orlando Furioso' overshadowed all the other romantic poems with which previous centuries had been flooded, and Torquato Tasso, whose 'Jerusalem Delivered' is a reaction against the worldliness of religion in his time, expressed in thunderous verse.

During the 17th century and the first half of the 18th, Italian literature suffered from a grandiose style and emptiness of ideas. But in the second half of the 18th century Count Vittorio Alfieri, with his tragic

plays, awakened Italy to a sense of her literary shallowness and also raised a wave of Italian patriotism.

As the impulse for a free Italy grew, there rose a vigorous new literature in the 19th century, the era when Italian national unity was won. Vincenzo Monti sang the conflicting sentiments of the early period. Alessandro Manzoni, who wrote the famous poem 'The Fifth of May' on the death of Napoleon and the novel 'The Betrothed', founded a romantic school frankly based on an imitation of the popular Sir Walter Scott. However, with the awakening of Italian national consciousness came a reaction against the imitation of foreign literature. New writers began to see Italy with new eyes. Giosuè Carducci in verse, and Matilde Serao and Antonio Fogazzaro in prose, wrote of Italy and things Italian, with a really indigenous point of view.



TASSO



D'ANNUNZIO

Overshadowing all other Italian writers in the first quarter of the 20th century was the figure of Gabriele D'Annunzio. He was famous as poet, novelist, and dramatist before the first World War. His exploits as a flier during the war added immensely to his popularity. Of more recent renown are Luigi Pirandello, Sem Benelli, Giovanni Papini, and

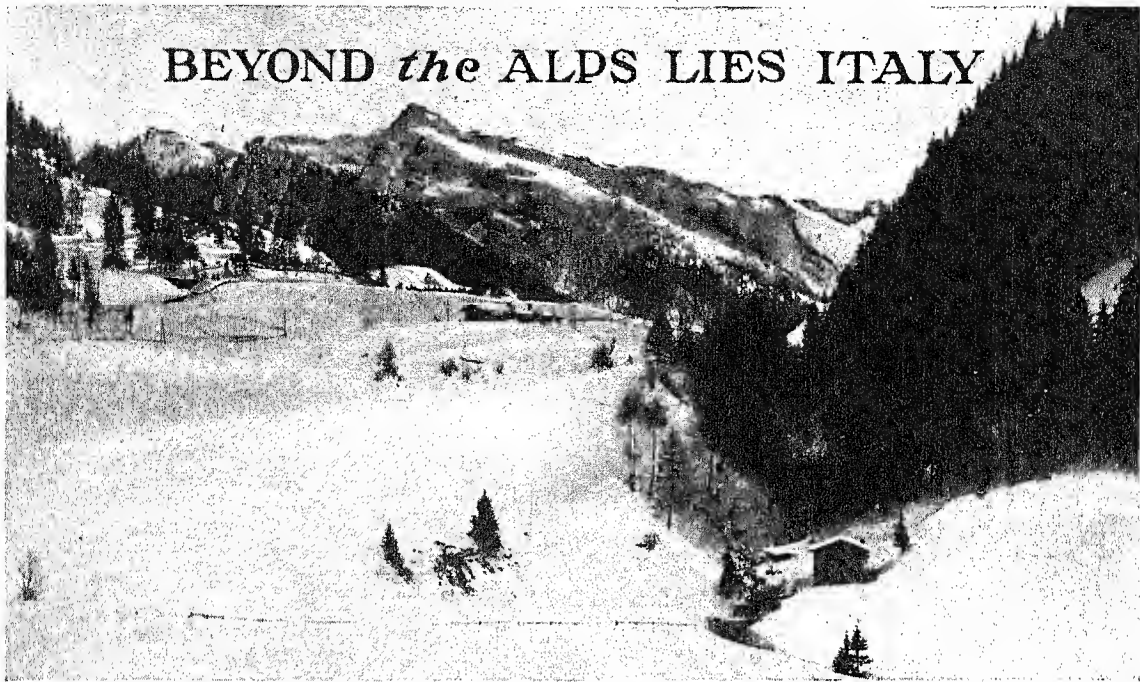
Benedetto Croce. Pirandello's 'Six Characters in Search of an Author' has been widely translated and was a theatrical success in America. Croce is one of the world's leaders of philosophical thought.

PROMINENT FIGURES IN ITALIAN LITERATURE

Dante Alighieri (1265-1321), epic poet—'Divina Commedia' (The Divine Comedy); 'Vita Nuova' (The New Life).
 Francesco Petrarch (1304-1374), poet—Sonnets.
 Giovanni Boccaccio (1313-1375), poet and writer of prose tales—'Decameron'.
 Ludovico Ariosto (1474-1533), epic poet—'Orlando Furioso'.
 Torquato Tasso (1544-1595), epic poet—'Aminta'; 'Gerusalemme Liberata' (Jerusalem Delivered).
 Giovanni Battista Marini (1569-1625), poet—'L'Adone'.
 Carlo Goldoni (1707-1793), comic dramatist—'La Bottega di Caffè' (The Coffee House).
 Giuseppe Parini (1729-1799), poet—'Il Giorno'.
 Carlo Gozzi (1722-1806), dramatist—'Turandot'.
 Vittorio Alfieri (1749-1803), dramatist—'Saul'; 'Oreste'; 'Virginia'; 'Timoleone'.
 Vincenzo Monti (1754-1828), poet and dramatist—'Aristodemone'; 'Bassevilliana'.
 Alessandro Manzoni (1785-1873), poet and novelist—'Il Cinque Maggio' (The Fifth of May); 'I Promessi Sposi' (The Betrothed).
 Giacomo Leopardi (1798-1837), poet—'La Ginestra'.
 Giosuè Carducci (1836-1907), poet—'Hymn to Satan'; 'Odi Barbare' (Barbaric Odes).
 Antonio Fogazzaro (1842-1911), novelist and poet—'Miranda'; 'Leila'; 'Daniele Cortis'.

Giuseppe Giacosa (1847-1906), dramatist—'Come le Foglie' (Like Falling Leaves); 'Tristi Amori' (Hopeless Love).
 Giovanni Pascoli (1855-1912), poet—'Poemetti'; 'Le Odi e gli Inni'.
 Matilde Serao (1856-1927), novelist—'Il Paese di Cuccagna' (The Land of Cockayne).
 Roberto Bracco (1861-1943), dramatist and novelist—'Piccolo Santo' (Little Saint); 'Donne'; 'Maternità'.
 Alfredo Panzini (1863-1939), biographer and critic—'Le Fiabe della Virtù'; 'Piccole Storie del Mondo Grande'.
 Gabriele D'Annunzio (1864-1938), poet, novelist, dramatist—'Fedra'; 'Il Ferro'; 'Forse che sì, forse che no'; 'Canzoni della Gesta d'Oltremare'.
 Benedetto Croce (1866-), philosopher—'Problemi di Estetica'.
 Luigi Pirandello (1867-1937), dramatist—'Sei Personaggi in Cerca d'Autore' (Six Characters in Search of an Author).
 Grazia Deledda (1875-1936), novelist—'La Madre' (The Mother).
 Giovanni Gentile (1875-), philosopher—'Discorsi di Religione'; 'Il Concetto del Progresso'.
 Sem Benelli (1877-), dramatist—'Cena delle Boffe'; 'Vita Gaia'.
 Giovanni Papini (1881-), critic—'Storia di Cristo' (Life of Christ); 'Un Uomo Finito'; 'Stronature'.

BEYOND *the* ALPS LIES ITALY



Only a lone motor car or a train puffing up the steep grade from Sterzing breaks the winter stillness of Brenner Pass. This view of the pass was taken from the Italian side, near the Italian-German frontier. Less than a mile high and lowest of all the passes in the Alps, this opening has been the historic military gateway between central Europe and Italy. Roman legions tramped into Gaul, and German barbarians swept down on Rome, through it. Charlemagne and Napoleon followed this highway to victory. When the Italians entered the World War of 1914-1918, the Allies promised to extend the northern frontier up to the pass, which had been in the Austrian Tyrol for a century. The promise was fulfilled in 1919.

ITALY. The peninsula of Italy dips down into the blue waters of the Mediterranean like a tall high-heeled boot, walking off towards Spain and kicking along the islands of Sardinia and Sicily in its path! The very top of the boot is rimmed with the snowy peaks of the Alps, and handsomely bejeweled with bright lakes—Maggiore, Lugano,

Como, Iseo, and Garda. Here also lies the flat fertile valley of the Po, richest of farm land. The leg of our boot is ridged by the Apennine Mountains (see Apennine Mountains); and scattered along its length are the plains of Tuscany, the Campagna di Roma, Apulia, and the fertile Campania near Naples. On the Adriatic side lies the misplaced "spur" of Mt. Gargano, partially inclosing the Gulf of Manfredonia; while in the hollow of the foot lies the deeply indented Gulf of Taranto. Many short rapid streams dart down the mountain slopes; but the chief rivers besides the 420-mile Po are Rome's historic Tiber, for centuries the seat of world power, the Adige, flanking the Po, Florence's Arno, and the Volturno. Our "boot" is 700 miles long and 350 miles wide.

Extent.—Greatest length, about 700 miles; greatest breadth: in north, about 350 miles; of peninsula, about 150 miles. Area (including Sicily, Sardinia, and other islands), 119,764 square miles. Population, about 43,000,000.

Colonies and Dependencies.—Italian East Africa (Ethiopia, Eritrea, Italian Somaliland), Libya (Tripolitania and Cyrenaica), Albania, and Aegean Islands. Area, about 1,300,000 square miles. Population, about 9,000,000.

Natural Features.—Mountains: Alps and Apennines. Volcanoes: Mt. Vesuvius and Mt. Etna. Rivers: Po, Adige, Arno, Volturno, Tiber. Lakes: Maggiore, Lugano, Como, Iseo, Garda.

Cities.—Rome (capital), Milan (over 1,000,000); Naples, Genoa, Turin (over 500,000); Palermo, Florence, Bologna, Venice, Trieste, Catania (over 200,000); Bari, Messina, Verona (over 150,000); Padua, Taranto, Leghorn, Brescia, Ferrara, Reggio Calabria, La Spezia, Cagliari (over 100,000).

Products.—Agricultural: grapes, olives, lemons, oranges, and other fruits; wheat, corn, tobacco, oats, rice, barley, rye; potatoes and other vegetables; sugar beets; dairy products. Manufactures: textiles (cotton, silk, rayon, and wool); wines, olive oil, sugar, clothing, leather goods, paper, steel, machinery, and automobiles; glass and pottery. Mining: sulphur, iron, zinc, lead, and marble. Fishing: tunny, sardines, and anchovies.

Its area is more than twice that of Illinois, and its population, which is growing, is more than five times as great. The climate has a rather wide range, from the chilly winters of the snowy Alps in the north, through the mild sunny central regions, to a semitropical warmth in the extreme south, where orange and lemon trees grow abundantly, and

the hills are "o'er-smoked by the faint gray olive trees." So blue are the skies and so bright and warm the air of most of the peninsula, so pleasant the life and so storied the soil, that poets have sung of Italy for centuries, and travelers return and return again.

The Glamor of Italy's Past

In fact, Italy stands today somewhat in the position of a fair dramatic masquerader, who has played such a romantic part that people dislike to lift the mask and look upon the well-known workaday features of modern humanity. They want to think of Italy as the home of ancient Roman ghosts, of gorgeous medieval princelings, of black politics in brilliant days, of artists and singers and dreamers. They are so bemused by her glowing art and radiant



It is easy to see from this map why Italy is often referred to as a "boot." It looks exactly like a booted leg, hanging from Switzerland as the body and about to kick Sicily into Africa. The "bones" of the leg are the rugged Apennines, which you can trace from France clear down the peninsula to Reggio. North of the Apennines is the valley of the Po, known as Lombardy, from the Germanic Lombards who settled there in 568. The valley of the Arno forms the district known as Tuscany, while the plain surrounding Rome is the Campagna. The district about Turin is known as Piedmont. The northern boundary shown in black is that which was fixed as a result of the World War, the white dots showing those portions of it which were formerly held by the Austro-Hungarian dual monarchy. The islands of Sardinia and Sicily also belong to Italy.

sunshine that they have almost ignored the strivings of her people today, in many ways finer than the loud greedy squabbles of Romans and Carthaginians, of Guelfs and Ghibellines, of Spaniards and French, in the long ago. Caesar's voice speaks clearer than Garibaldi's to most people still.

Perhaps they feel thus because Italy has been a free nation—has had a vital present and a hopeful future—for so short a time. She emerged from division and foreign misrule only as late as 1870. The Lombard invasions and the rise of the Papal States broke the unity of Italy in the early Middle Ages.

THE LIBERATOR OF ITALY AT A CONFERENCE WITH THE HERO KING



Garibaldi, though theoretically a republican, was greatly attached to the bluff soldier-king, Victor Emmanuel of Sardinia, and the two cooperated in driving the Austrians from Italy. When the first volunteer troops were raised in 1859, the King appointed Garibaldi commander, and when Garibaldi decided on the conquest of Sicily, Victor Emmanuel helped him. After the successful conclusion of this enterprise Garibaldi handed over his conquests to King Victor, who was soon after proclaimed King of United Italy.

Since then emperors and popes, kings of Naples and dukes of Milan, had dreamed in turn of restoring the "kingdom of Italy"; but its five chief powers—Venice and Florence, Milan and Naples, and the Pope—rarely united of their own accord. France and Spain made Italy a battleground of bloody rivalry; and the substitution of Austria, following the French Revolution, as the chief controlling power—with Venetia and Lombardy directly in her rule—made the outlook yet more gloomy. As Metternich, the Austrian statesman, truly said, Italy had become "only a geographical expression."

But brave blood was many times shed in the hope of remaking Italy. A secret society called the *Carbonari* ("charcoal burners") flourished in the early part of the 19th century, with the overthrow of native and foreign despotism as its object. Not merely rude peasants but fiery patriots of the best families were among its members, blackening their faces and otherwise disguising themselves to carry on their political conspiracies.

Revolts in 1820 and 1830, however, were crushed by Austrian troops. Then the idealistic republican, Giuseppe Mazzini (*see* Mazzini), organized his revolutionary society called "Young Italy." And while King Charles Albert of Sardinia-Piedmont in the stirring days of 1848 battled unsuccessfully against the Austrians at Custoza and Novara, Mazzini drove out the Pope and set up a brave but ill-starred republic in Rome. French soldiers of Napoleon III, however, soon conquered it, and Italy was, as before, a dark realm of Austrian and Bourbon tyranny in the north

and south, with the temporal power of the Papacy between. Only Sardinia-Piedmont under its new hero king Victor Emmanuel II kept its constitution and the Italian tri-colored flag.

But this, as it proved, was the seed from which Italian unity and liberty should grow. Under the able leadership of that shrewd diplomat Count Camillo Benso di Cavour (*see* Cavour), the great minister of Victor Emmanuel, Sardinia-Piedmont grew strong in resources and in alliances. Cavour had learned that, genuine as was Italian patriotic fervor, Italy would never be unified without help from abroad. Therefore he cleverly won the alliance of Napoleon III of France, and in the spring of 1859 Austrian stupidity and pride were skilfully goaded into declaring war. France and Sardinia-Piedmont defeated the Austrians at Magenta and Solferino, and so won Lombardy for United Italy. But Napoleon, startled at the dust he had raised, hurriedly arranged matters with the Austrians, allowing them to retain Venetia. Cavour and Victor Emmanuel were clever enough to veil their disappointment and wait. At once the small states which checkered north-central Italy—Tuscany, Modena, Parma, and the Romagna—cast out their absolute princes and joined the victor of the north. Napoleon III consented to the arrangement, in return for the cession by Piedmont of Savoy and Nice to France.

This second stride toward a United Italy came next year, when the famous soldier of fortune, Giuseppe Garibaldi, gathered about him his thousand volunteers, stormed the island of Sicily, and then the main-

land part of the kingdom of Naples. The people everywhere hailed him as a liberator, and drove out the hated Bourbon king. (See Garibaldi.) There remained only the Papal States and Venetia to be joined to the new-made Italian nation, when (in February 1861) Victor Emmanuel of Sardinia was proclaimed King of Italy. Venetia was gained in

manuel II, was assassinated by an anarchist. His son, Victor Emmanuel III, the present king, succeeded to the throne. In 1908 an earthquake destroyed the city of Messina in Sicily and killed 77,000 persons. Another terrible earthquake took 30,000 lives in central Italy in 1915.

Meanwhile Italian statesmen were attempting to gain territory in Africa for colonial expansion. On the east coast they obtained two colonies of doubtful value, Eritrea and Italian Somaliland, and on the north coast they won Tripoli after war with Turkey (1911-12).

The World War of 1914-18 added large tracts of land formerly under Austrian rule, including the "unredeemed Italy" of the Trentino in the north, and the peninsula of Istria at the head of the Adriatic.

In spite of a terrible reverse at Caporetto (see World War), the brilliance and perseverance of the Italian troops struggling with the Austrians in the Alpine passes, and their heroic stand when rallied on the Piave River, proved the vigor which 50 years of freedom had put into Italian blood.

However, all was not well with Italy. When it entered the war, Italy had been torn in two by the

advocates of neutrality and the pro-war faction. At that time a former bricklayer, Benito Mussolini, editing the socialist newspaper *Avanti*, in Milan, was discharged from his position and expelled from the Socialist party because he preached with fiery words that Italy ought to join the allies in the war. He enlisted, was wounded, and was decorated for valor. He returned a hero and an enemy of socialism.

For at that time socialism seemed to drift toward bolshevism. Returning soldiers were mocked in the streets. Patriotic receptions of the troops were prevented. Strikes paralyzed industry. The government as then organized was powerless. The King chose the prime minister, who picked for his ministry men whose party strength was great enough to give him a majority in the Chamber of Deputies. But since it was not possible to please all his followers for long, ministries were never strong and did not last.

Meantime bands of former service men roamed the country, angry, embittered, dangerous, eager to strike a blow against the evils which menaced their country, but unorganized and slipping toward lawlessness. In these bands Mussolini saw his opportunity. With his gift of eloquence he soon organized them into groups in each community, armed them with sticks, and set them to righting the most obvious wrongs, and to preserving order. Each group was called a *fascio* (which

A SUNNY SON OF SUNNY ITALY



The disposition of the average Italian in his native home is as sunny as the land he lives in. This is an ox-cart driver who hauls the famous Carrara marble. The white "Roman" oxen are a celebrated breed, noted for their great strength.

1866, after Austria was defeated by Prussia, in alliance with Italy.

Rome alone was now outside the Italian kingdom, and the lack of that central and dividing strip of territory was a very real handicap.

French troops still guarded the Pope's sovereignty, and Victor Emmanuel was too intelligent a pupil of Cavour (who had died in 1861) to attack the French and thus perhaps undo all that had been accomplished. Once more he let "the stars in their courses work for Italy." In 1870 the Franco-Prussian War forced France to withdraw her soldiers from Rome. The Roman people welcomed the army which Victor Emmanuel marched into Italy's ancient capital. Pope Pius IX, excommunicating the invaders, withdrew into the Vatican, where he and his successors remained "voluntary prisoners" until the Concordat of 1929 between Italy and the Holy See recognized the temporal power of the Pope as sovereign ruler over the Vatican and a small adjacent territory.

Giant tasks lay before the new Italy. Though staggering under a load of debt and heavy taxation, it built up a strong army and navy, and developed railroads, ports, schools, and a merchant marine. Manufacturing industries sprang up, bringing with them labor troubles and class struggle. In 1900 King Humbert, son of the first king, Victor Em-

means a bundle or bunch) in token of the close union of its members, who were called *Fascisti*. For the emblem of the organization they took the bundle of *fasces*, or rods, which the old Roman lictors carried as a symbol of authority; and their program was known as *Fascismo* (see Fascism). The Fascists were bound by oath to consecrate their lives to Italy.

In 1919 the soldier-poet, Gabriele d'Annunzio, launched his attack upon Fiume (see Fiume) and stirred all Italy to a high degree of national fervor, which was fostered by the Fascists. When the radical element called a general strike the following year, the Fascisti were strong enough to end it. In 1921 they broke up a Socialist reunion in Rome. In October 1922, uniformed in black shirts, they held an enthusiastic congress in Naples.

The government was too weak to control either the radicals or those who now put fear into the radicals. The Fascists were offered any post except that of minister of the interior, which controlled the police, but the offer was refused, and the Fascists in October 1922 prepared to march to Rome. When the King, Victor Emmanuel, refused to allow the proclamation of martial law to block their advance, the prime minister resigned and Mussolini was asked to form a ministry. (See Mussolini, Benito.)

Mussolini kept for himself the ministries of the interior and of foreign affairs. Within a few years he reorganized the government so that the people no longer had any direct voice, and all power was centralized in his hands. The King was retained, because he had little real power, was revered by the people, and had the support of many wealthy and important families whose help Mussolini needed. But Mussolini destroyed the importance of the Chamber of Deputies by abolishing all but the Fascist party, by allowing only a vote of "yes" or "no" on the Fascist list of candidates as a whole, and by taking from the Chamber the power to consider any bills but his own. In addition to these measures, a censorship of news was established, public meetings without government license were forbidden, and special courts were set up to try privately those who criticized or opposed the government.



Benito Mussolini, Italy's "strong man," is here standing in his stirrups to greet his Fascist militia. The Fascists commonly refer to him as "Il Duce," that is, "the leader."

While destroying the old democratic government, Mussolini set up the new Fascist state. This is based on the doctrine that the welfare of the state is all-important, that the individual exists only for the state, owes everything to it, and has no right to protection against it. Government is administered by a limited number of qualified and devoted leaders, whom all the people must obey. The people take no direct part in government affairs, except that periodically they are given an opportunity to vote their approval.



THE
FASCIST
SALUTE

To restore Italy to its ancient greatness was the dream of Mussolini and his "Blackshirt" followers. In token of this they adopted the old Roman salute—arm outstretched above the head, with palm down.

To build up Italy economically Mussolini organized the "corporative state" system. Employers and workers in every industry were organized into regional syndicates, and these syndicates were linked together into national corporations with power to force the settlement of disputes between employers and workers, and to keep industry going in good and in bad times. No strikes or lockouts are permitted. Representatives of these corporations and certain government officials form a Council of Corporations. Mussolini became the first minister of corporations.

Mussolini's Government

Control of all government is maintained through the Fascist party, with Mussolini as its head. Members are recruited mainly from young men trained to be good Fascists in the boys' organization called the *Balilla* and in the young men's *Avanguardisti*. Mussolini names a Fascist Grand Council to advise him. This council, with the king, is empowered to name Mussolini's successor at his death.

In 1938 the elected Chamber of Deputies was replaced by a Chamber of Fasces and Corporations. This new chamber is composed of all the members of the Council of Corporations and the National Council of the Fascist party. Thus no semblance of popular elections remains. Mussolini, acting as minister of the interior, names the prefects of the provinces and the *podestà*, or mayors, of the cities.

Even though Mussolini rules as a dictator (*see Dictatorship*), his continued power depends on his ability to hold popular support. Hence he loses no opportunity to fire enthusiasm by organized demonstrations and frequent public speeches.

Education and Relations with the Church

In return for permitting the existence of an independent Vatican City, the government gained (1929) from the Catholic church the right to approve the appointment of its bishops and to control the education of the young except for brief periods of religious teaching. The emphasis of the religious teaching is on universal brotherhood, peace, and duty to God in moral questions. This is contrary to the fascist beliefs in the superiority of Italians, glorification of war, and prime moral duty to the state.

Education has received special attention under the fascist government. Great sums have been spent on a unified educational system in the effort to end illiteracy and to get the people to use the official Tuscan language instead of the 15 provincial dialects. Physical education and military training are stressed.

Building Up the Nation

With all power thus in his hands, Mussolini set about to strengthen Italy at home and abroad. Considering a growing population a sign of strength, he shut off emigration. The death rate was cut by encouraging attention to health and strength and by reducing malaria, pellagra, and other preventable diseases. In spite of a falling birth rate, which taxes on bachelors and prizes for large families failed to stop, the population increases about half a million a year.

To feed this growing population in a poor country, the Italian government has promoted agriculture in various ways. Only about half of the country is adapted to farming, and hence all available land is being reclaimed by irrigation and drainage. Enormous tracts have been drained in the Maremma or swamp lands of southern Tuscany, in the Roman Campagna (Agro Romano), in the Pontine marshes (Pajudi Pontine), and in sections of Sicily and Sardinia. The Pontine region, from which malaria had once driven all inhabitants, became the fertile Littoria province in 1934. To increase the efficiency of agriculture in Sicily, feudal estates there were broken up and made into small farms for peasants.

In an effort to overcome deficiency in raw materials, Italy extensively developed substitutes and synthetics. Possessing little coal, it harnessed Alpine rivers for hydroelectric power. Its lack of coal and iron, and also of petroleum, which was little eased by acquisition of Albanian petroleum, make Italy heavily dependent on imports. Hence the government encouraged production of goods and crops for export, notably cotton, silk, rayon, olive oil, and wine.

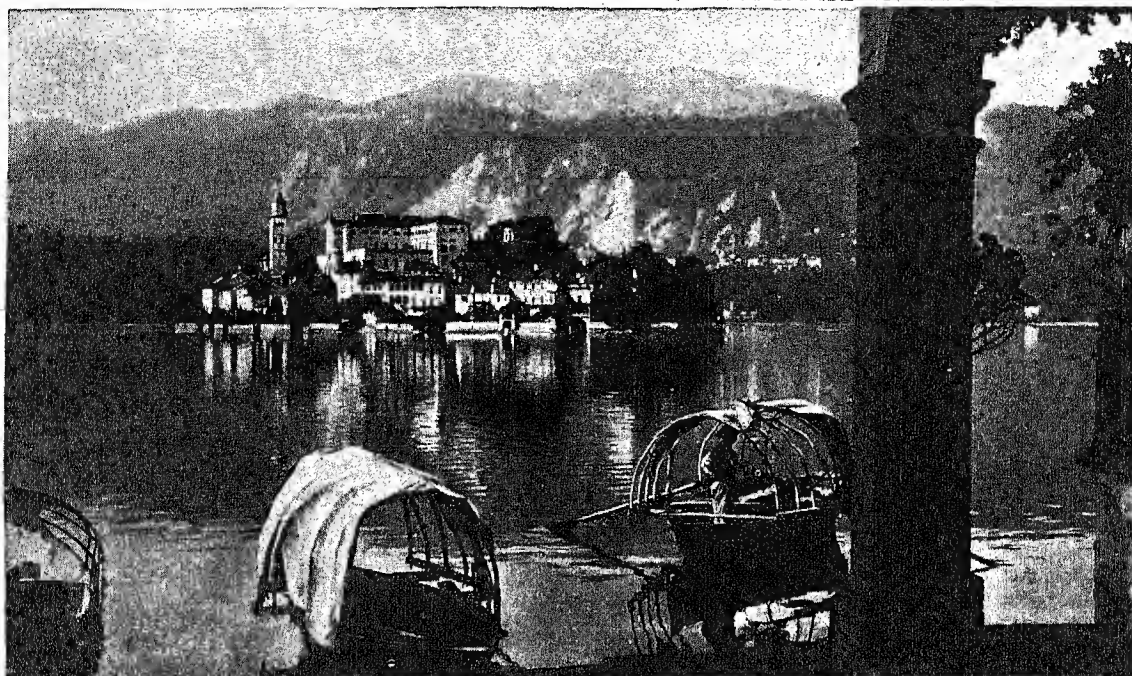
Foreign Policy Issues Lead to European War

Most Italians believed that their country had been unfairly treated in the division of German colonies and Austrian territory after the first World War. Mussolini promised redress by winning new wealth in foreign fields. To this end, he began to build up huge armaments. His first big gain came in 1936, when he conquered and annexed Ethiopia (*see Ethiopia*). This new colony promised to be of little economic value, however, until it could be developed.

In October 1936 Italy began its partnership with Germany. At Mussolini's invitation, the two fascist nations formed a "Rome-Berlin axis," to oppose the power of France and England. Axis intervention helped to make Spain a fascist state. Axis pressure on England and France gave Czechoslovakia to Germany in the Munich Pact. And in April 1939 Italy invaded Albania, making it a protectorate. Italy and Germany then became formal military allies. (*See also Albania; Czechoslovakia; Spain.*)

But when its program of aggression plunged Germany into war with France and England on Sept. 3, 1939, Italy at first adopted the position of a "non-belligerent." On June 10, 1940, however, Mussolini joined Germany in the war. The fall of France a week later brought minor concessions to Italy. Soon after, the Italians launched an offensive on British possessions in Africa, but their major assault—upon Egypt from Libya—was repulsed. Then, on October 28, Italy invaded Greece from Albania. Here too the Italians suffered military reverses as the Greek counteroffensive drove deep into Albanian territory. German military intervention in Greece in April 1941 quickly converted an Italian defeat into an axis victory. Two months later Italy followed Germany into war against Soviet Russia. But as the price for sharing in Germany's military triumphs, Mussolini had to

ONE OF THE BEAUTIFUL LAKES OF NORTHERN ITALY



A view across the Lake of Orta, westernmost of the group that includes Lakes Maggiore, Como, Garda, and others. That island is called San Giulio. The church marked by the tower near the left end of the island was founded in 379 A.D.

accept the rôle of Nazi puppet, with consequent loss of prestige. (See also World War, Second.)

Divisions of Italy

Let us now look more closely at the three great regions into which Italy falls. Northern Italy includes Lombardy, Piedmont, Venetia, Emilia, Liguria, and Tuscany. Here we find the leading manufacturing cities, and the busy ports of Genoa and Venice. Silks, automobiles and machinery, Leghorn hats, jewelry, mirrors, and majolica and glassware of world-wide fame are produced. The soil yields white marble, wine, and a great variety of foodstuffs, including world-famous cheeses, flax, and rice from the wet lands. The people are well educated, substantial, and progressive.

Central Italy is for the most part a rugged and broken country of mountains, valleys, and plains. It includes Umbria, the "Marches," Abruzzi and Molise, and the Romagna. In general one may say that most of the artists, musicians, and professional leaders of Italy come from the central section. The

AN ITALIAN FISHERMAN



A large proportion of the people along the Italian seashore are engaged in fishing. The fishermen and their boats are picturesque sights for the visitor.

district is chiefly agricultural, having but two large cities, Rome and Naples.

The south—Campania, Apulia, Lucania, Calabria, Sicily, and Sardinia—is still hampered by ignorance and poverty. The peasants plod over the brown hills behind their great oxen, working for 16 and 17 hours a day. There are few cities in the south, and the people are strangely content in their hard life.

The people of all sections are conspicuous for their charm and courtesy, for their combination of simplicity with cynicism, for their quick temper and kind heart. They have a keener taste for luxury and finery than Americans, perhaps; yet few Americans could be so frugal, so tolerant of long dull labor, so gentle and patient in hardship. The Italian sings blithe "stornelli" all the long hard day—as he trims his vines or tends his small neat fields, stopping only for the monotonous meals of corn mush, cheese, bread, and wine. It is hard to understand how Italians got their reputation for being

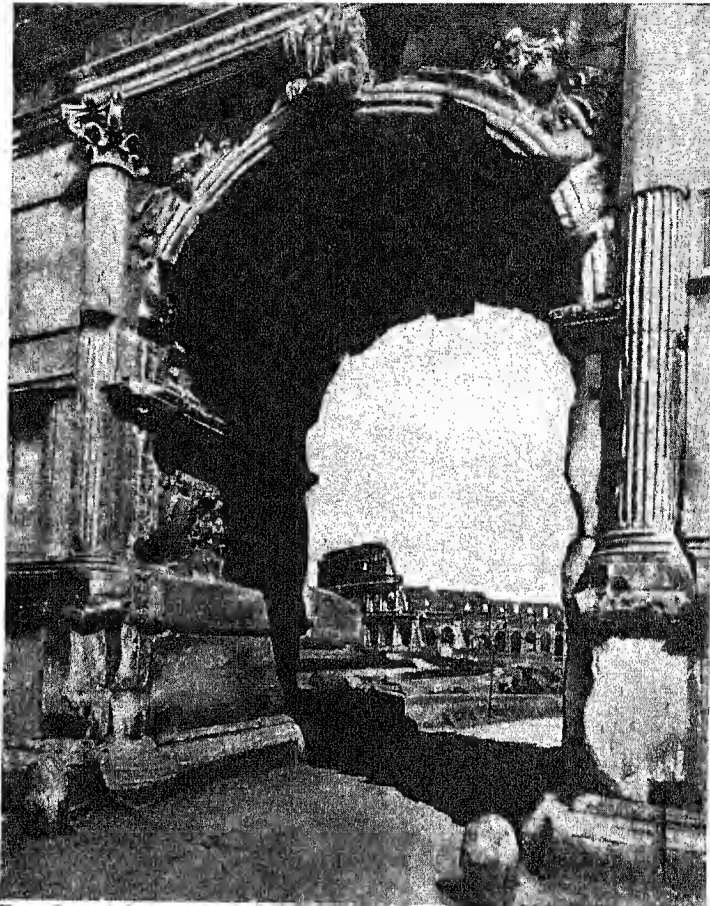
lazy, since it is their strong bodies which have carried on the campaigning of the industrial world everywhere—building railroads, mining coal, wrestling with the hardest labor. They are not lazy, neither are they pale or still or cool in any respect, whether in their faults or in their virtues.

Closely connected with the Italian blood and destiny are the people of the curious little republic of San Marino, which claims to be the oldest state in Europe. It is an independent nation of 38 square miles near the Adriatic coast, and with a population of some 15,000 souls. It is completely surrounded by Italian soil and is bound by a treaty of friendship to Italy. Legendary history states that it was formed in the 4th century by St. Marinus of Dalmatia, and certainly its independence was formally recognized in 1631

by Pope Urban VIII. The frowning castle and two great towers of the town of San Marino, capital of the republic, look down on scenes little changed since medieval days. Winding streets, so narrow that vehicles are rarely used, slant up and down, running between rows of small stone dwellings, many of which seem in danger of tumbling from their perch on the uneven ledges and steep slopes.

The customs of this interesting town, too, are full of colorful survivals of the Middle Ages. On the evenings of festival and election days beacon fires are lighted on the hilltops, summoning the countryside to the merry-making. The rest of the year life flows placidly on, undisturbed by the current of modern life; for San Marino has little to do with the outside world except as a market for her stone, wool, and wine.

THE SPLENDOR THAT WAS ROME



Here the traveler, standing where conquerors and martyrs have marched, looks through the Triumphal Arch of Titus at the ruins of the Colosseum. The Arch was built to celebrate Titus' victory over Jerusalem in 70 A.D. Reliefs on one side show a triumphal procession of captive Jews; on the other Titus is pictured being crowned by Victory. Titus was the successor of Vespasian, who founded the Colosseum and dedicated it with 100 days of games.

Dark whites of the Mediterranean race inhabited Italy in the Stone Age, and a substratum of this population exists to this day. The Latins, who founded Rome, were one of a group of fairer "Aryan" peoples, who came into the peninsula before recorded history begins. Etruscans, Greeks, and Carthaginians—Goths, Vandals, Lombards, Saracens, and Normans—all flowed over the land leaving traces of their blood in the Italians of today.

Following the downfall of the Roman Empire in the West (see Roman History) and the fleeting rule of the barbarian kings, Odoacer the Herulian and Theodoric the Ostrogoth, came an equally fleeting reunion of Italy to the Eastern Empire (see Justinian I). The Frankish conquests of the Lombards by Charlemagne (see Charlemagne) and his coronation at Rome in 800 checked for a time Italian disintegration, to be resumed with the rise of feudalism. The refounding of the medieval empire by the Saxon Otho I (in 962), and his assumption of the old "Iron Crown of Lombardy," brought only nominal union of Italy with Germany (see Holy Roman Empire).

Even the rise of the powerful city states—Florence, Venice, Genoa, Milan, and their fellows—helped

on the division and weakness by adding another disintegrating factor to the age-long conflict of Papacy and Empire. The epoch of French and Spanish rivalries for Italy began with the triumphal raid of Charles VIII of France through the peninsula to Naples, in 1494. It closed with the recognition of the Spanish rule of Charles V over Sicily, Naples, and Milan, in 1544.

Thenceforth the bustling Greek-like cities of Italy, in which the Italian Renaissance had flowered in masterpieces of literature, art, and science, stagnated under petty dual houses. French Bourbons supplanted Spanish kings in Sicily and Naples in 1738; and the French Revolution and the conquests of Napoleon for a time overwhelmed the peninsula. Then Bourbons and petty dukes regained despotic power in 1815, and the harsh rule of Austria lay heavy on Lombardy and Venetia. But a new spirit of nationality brought the *Risorgimento*, "reawakening." Finally, between 1859 and 1870, the heroic labors of Mazzini, Cavour, Garibaldi, and Victor Emmanuel freed Italy, welding it into a strong, united nation with a constitutional government.

ITALY *in all* HER GLORY



"Who has not seen the picture of the miraculous Cathedral of Milan? Once we have seen the picture of this place we must remember it always, but the picture shows not half its wonders. We climb up the heights and grow more bewildered as we climb, for if marble statues grew like trees and this had been a forest, it could hardly be more astonishing than this maze of human art—marble statues everywhere, marble figures, columns, groups, animals—a very forest of marble pinnacles and on every pinnacle a statue of life size."



FO THE traveler who has seen much of the world the thought of Italy comes like the return of years gone by. It comes like the rolling back of the Past.

It is not true that the Past has gone forever, for it lives in the human mind, it is built up into the Present, it marches on into the Future for which we live, and towards which all the hours of our lives are moving. And the thought of Italy is like the coming back of the Past to him who has been in that great land, for Italy is the land of the magic Past. Nowhere else does history unfold so proudly and solemnly before us.

It is like a casket of rare jewels, this glorious land, like jewels heaped on jewels, and the mind wanders when we think of it—now to Rome, where we seem to walk again in the spacious days of Caesar; now to Pisa, where we turn the corner of its clean white streets and look upon a vision that has moved the hearts of men for century after century; now to Naples, where Pompeii is turning over in the sleep of ages; now to Venice and the glory that is greater than words; now to Florence, the little heaven set up by human hands upon the earth.

From one place to another the mind of man runs, yet they are only as the peaks of a mountain range. Between them, from Venice to Naples, in that long strip of earth guarded by the rising mountains and the rolling sea, lie more wonderful places, more marvelous things, more mighty works of the hand of

man, and more deathless memories of the human race, than can be found in any other land beneath the sky. Let us run to one or two of the places and look at one or two of the things that have made this land immortal. It is not the richest land on earth, but it has laid up a treasure upon earth that moth and rust will not corrupt.

Still its ancient cities ring with the hammer of Michelangelo, still we seem to catch the music of Giotto's dream. The sweep of Raphael's brush is fresh upon its walls; the children of Della Robbia look down upon its floor; the tenderness of Fra Angelico haunts its cloistered shades; the images of Donatello give out their inspiration still. And from every corner of this magic land the wonderful towers rise high toward the sky. They point upward and upward, and they tell of the striving of man to reach the mighty heights. How high the mind of man has climbed in this land no words can tell.

The American traveler reaching Italy will surely call at Turin and climb to the height where travelers go a thousand miles to stand. Here lie the kings of Sardinia, in a tomb fit for kings, and fit for better men than most of these; but we bother little about the tombs, for in front of us and around us are the Alps, the mighty natural treasures of this Treasure Land, hundreds of miles of Alps, set up there for us to see them at a glance, with their snowy peaks in the clouds a hundred miles away.

One of the great modern towns of Italy is Turin, but there is nothing the traveler badly wants to see after the great view from the Superga; and soon we are in the train again for the ride by the Mediterranean, a journey unsurpassed, perhaps, in Europe for historic interest and natural majesty together. Through mountains and over them we go, past medieval towns and ruined castles, through ravines, over rivers and along embankments, in and out of 20 tunnels, before we come to Genoa and catch a glimpse of the great harbor, with nearly 500 acres and seven miles of quays, where a boy named Columbus used to watch the ships go out, already dreaming of what wonders might lie beyond the western sea.

No Sunlight for Centuries!

A striking sight the houses of Genoa are, rising so high that not for centuries has the sun peeped into these narrow ways; and so built up to one another that even an earthquake could hardly shake them down. Pressed in between the high hills and the sea, Genoa could grow only upwards, and up she has grown, with houses piled up like boxes.

We hurry past in our train, now on the most splendid part of all the road to Rome, the road from Genoa to Pisa, on the very edge of the blue Mediterranean. It is like a paradise on earth, this Italian Riviera! Nearly a hundred tunnels there are, piercing these cliffs, and each one brings us into some new scene of glory. Mountain villages, olive woods with their restful green, the rocky coast which Byron loved and where he wrote, the little bay where Shelley was boating when he was drowned, and the town where Byron burned his body on the shore, the green cypress trees that give a dreamy look to every place, the yellow broom and the orange trees with their golden balls—these and the blue sea all the way make up a matchless ride.

The Famous Quarries of Carrara

Wonderful it is to see the castles perched on these mountain peaks, and the little garden patches on the rocky slopes! Everywhere the peasants of this mountain land snatch bits of earth from Nature, even from rocks of marble, as here at Carrara with the marble mountains, which thousands of men spend their lives in cutting up. For centuries men have been cutting up these mountains, and now from 600 quarries they cut out 400,000 tons of marble every year, while artists sit in their studios near by carving statues out of it, and builders everywhere, near and far, build town halls and cathedrals of it. But men may cut for centuries, and centuries may come and go and the mountains will still be there.

Seven hours from Turin lies a sweet little place, clean and white like a room that has been spring-cleaned, and as we run across the plain there comes into view a tower that seems to be falling. It is Pisa.

Beautiful little Pisa! We can walk round it in an hour or so, yet this little place was once a mighty state, a place of strength with a proud story behind it, when England was still a petty kingdom.

Time was, before the sea left Pisa, when this little state kept the infidel out of Europe. The power of these Italian city-states was wonderful, and Pisa only lost her power by the treachery of an admiral. But she had a proud story before this sound of doom fell on her ears, and she put up a famous group of buildings as a thanksgiving.

We turn round the corner of a narrow street and come upon them, as fair a scene to look upon as anything man can dream. It is a thing for tears to remember that men could build such monuments as this 700 years ago, and that in the World War men were blowing things like this to pieces! The wonderful cathedral, with one of the longest transepts in Europe; the baptistery, with a pulpit among the rarest treasures of the earth; the majestic campanile or bell-tower, with no visible imperfection except that it is leaning—as if it were tired after 740 years—remain without a rival as an architectural group, though centuries have come and gone and Michelangelo has lived and died since these stones were set in their places. All the world has heard of the Leaning Tower, which served Galileo, who used to walk about these streets, for one of his great experiments; but it is said that this great campanile was only one of ten thousand towers built in the great days of Pisa!

The Beauty of Pisa's Cemetery

But there is another thing in Pisa that lingers in the memory of those who have been there. If beauty and simplicity make a place sacred, it is one of the holy places of the earth. It is the Campo Santo, the little graveyard where for centuries the great men of Pisa were laid to rest. There are precious pictures round the cloistered walls, and many other priceless merits artists have put here too; but it is the pure and simple dignity of this little garden that we can never forget. So near as men can make it, it is perfection, perhaps the sweetest little cloistered place on the continent of Europe, where a man who has come from the busy world may rub his eyes and think it all a dream.

The very earth on which we tread in this sweet place has come from Calvary; long before the ships of England brought pilgrims to America the ships of Pisa had brought earth from Jerusalem to make a garden here. A great imagination Pisa had, and the Campo Santo is its monument. Death was not a cruel thing to them. They lived their day and did their work, they left their mark on the sands of Time, and they laid them down to rest.

There are travelers who like it better, this home of sleep at Pisa, than the house of sleep that lies far off in northern Italy, and is known to all the world as Milan Cathedral.

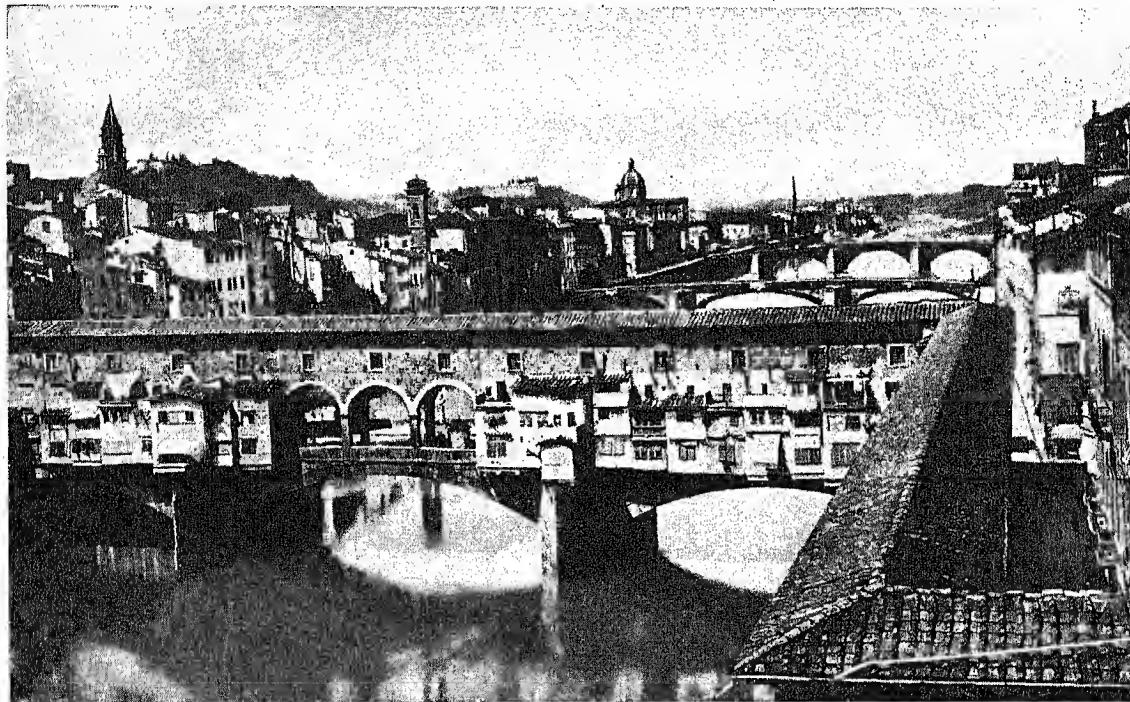
Who has not seen the picture of the miraculous cathedral of Milan, the noblest thing of art in the great industrial area of Lombardy that Milan dominates? Once we have seen even the picture of this place we must remember it always, but the picture shows not half its wonder.

Remember that this great place is made of white marble, and that if you saw a thousandth part of it—any thousandth part of it, almost—by itself, you would say, "What a beautiful thing! What infinite patience!" It is not the interior of it that is wonderful. What you can never get out of your mind, once having seen it, is the mazing, almost magical, effect of the exterior. Other great Gothic cathedrals are of soft gray stone, wind-bitten and crumbling, darkly meditative, mysteriously hiding age-worn saints and angels in their vague shadows. The Duomo of Milan is icy hard, dazzlingly clear in detail. Its pure white

surprised to see chairs and benches about, and even a small restaurant serving coffee and ices up here among the wonders. Several happy cats roam the roof and blink at the golden Madonna, on the tower, 356 feet above ground.

When the bright Italian sun, pouring upon the white marble, has wearied your eyes, you climb down again into the rich darkness of the church. Here anew you realize the enormous size of the cathedral, third largest in Europe, surpassed only by St. Peter's in Rome, and the Cathedral of Seville. It is 486 feet from one end to the other, a long look through another forest of

FLORENCE'S FAMOUS BRIDGE OF GOLDSMITHS, THE PONTE VECCHIO



Joining the world-famous Uffizi and Pitti art galleries of Florence is this 14th century stone bridge, the Ponte Vecchio (Old Bridge). For centuries goldsmiths have had their dark little shops in the plastered houses along the side of the bridge, and today most tourists do not consider their visits complete until they have made purchases here. The ancient bridge spans the river Arno, which cuts the city of Florence in two.

marble hides nothing, seems to hold no shadows. From its roof a forest of pinnacles in sharp white stone rises up, and time has not splintered one lance of this delicate defiance. On every pinnacle stands a statue, more than 4,000 carven heroes and martyrs. They raise a victorious cross, they lift prophetic arms or prayerful hands, sharp and perfect as though newly chiseled.

All these active, expressive stone beings create, in their thrilling silence, an intensity of life and movement around you as you walk about, after a long climb, on the roof of the cathedral. Every visitor walks there, wandering with excitement among the ranks of leaping spires, up airy curling stairways of fretted stone, through exquisite chapels like precious caskets. The cathedral roof is alive with a life of its own, like an enchanted marble city, and you are not

stone, great thick soaring columns which support the roof. Its form of a Latin cross spreads 287 feet wide. You look far up to the pointed arches of the vaulting, and you see a ceiling that appears to be of openwork sculpture. But it is only a clever, unworthy trick of chiaroscuro painting, a sorry sight in a noble building. You are sorry, also, that almost all the huge stained glass windows were made in 1844, and not in the great days of window making. You hear the guide boastfully remark that these stained glass windows are "the largest in the world." Perhaps they are, but they are as insignificant as they are large. They do their weak, modern best to warm the cold and solemn stones piled five centuries ago.

The great cathedral was founded in 1386 by the vow and the purpose of Giovanni Galeazzo Visconti, ruler of Milan. The Visconti family bequeathed the quar-

ries of Ticine to this church, and a canal was built solely to carry blocks of white marble for the slowly rising structure. The Viscontis and their successors were great and grand. They filled the cathedral with pompous tombs, glittering ornaments, bright banners, proud arms. Two centuries later, along came Saint Carlo Borromeo, archbishop of Milan, a stern ascetic who swept the cathedral clear of all this worldliness. Strange to say, Saint Carlo lies to-day in the depths of this great cathedral in one of the most gorgeous tombs in all the world! The severe archbishop was as brave as he was stern. When a plague swept Milan in 1576, he went about with calm courage directing the care of the sick and the burial of the dead. Everyone admires courage. When Saint Carlo died, his fellow-townsmen wished to do him great honor. So today he lies amid gold and silver, crystal and gems, in a treasure crypt worth nearly a million dollars.

The sacristan, with lighted taper, will take us down to see it. When the taperlight gives way to the brilliance of this great ascetic's tomb, the eyes literally are blinded. We are in a large eight-sided room of solid silver, storied silver, each of the eight panels a bas-relief showing a scene from the life of Saint Carlo. From the ceiling sparkles a cross of emeralds and diamonds, gift of the Empress Maria Theresa. But we fix our gaze, inevitably with horror, upon the brown, stiffened, withered body of the saint, as it lies in red, pontifical robes in a great casket of rock crystal and silver, gift of the evil King Philip IV of Spain. Its hand clutches a pastoral staff of gold and gems, and above the head hangs an ethereal, gold, bejeweled crown, probably the work of the masterly Benvenuto Cellini. To us of another age and another race,

it seems that such gaudy exposure of this meaningless body does violence to dignity and decency. It is the moment to call upon our powers of understanding, and to remember that in the 16th century nerves were not weak nor tastes squeamish. To the Italian eye, the gems and silver and crystal honor the bravery which defied the plague, and not merely the pitiful dead bones.

So we always come to feel in Italy, that the golden, vivid Italian imagination has a power to glorify with its shining art all the horrors and tragedies of life. Art is no museum affair in Italy. It graces all life, from the gesture of the peasant in the field to the fruit clusters over the doorways.

Somebody has said that the singing of nuns sounds like angels in Rome. Life turns to a dream as we walk in Venice, Verona, Florence, Pisa, Siena, or Assisi. You may read elsewhere of Rome, but we shall glance now at the two glories of Italy, Florence and Venice, where, as so often we see them in Italy, fine statues and delicate art stand out in sun and rain.

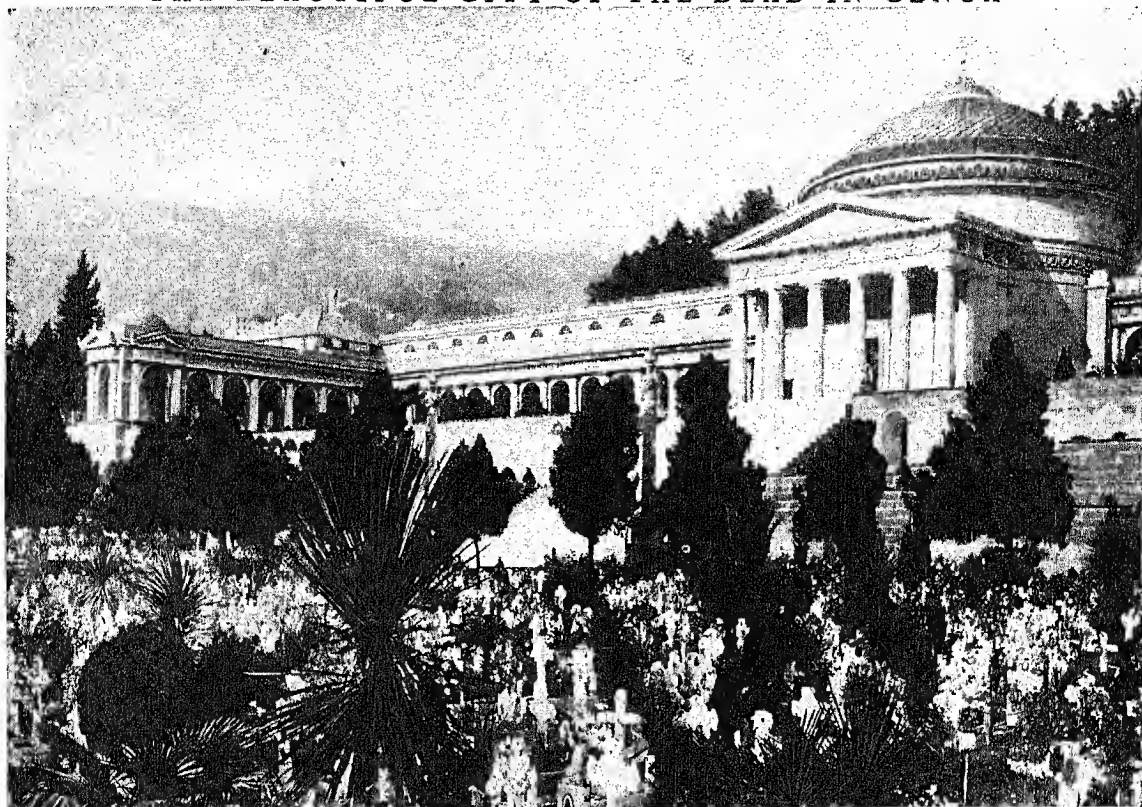
He who has been to Florence will never forget it while his memory lasts. It is like a poem that would not come in words and was written in stone, and the names of its poets are legion. Its squares are little worlds of art. Its shops are packed with gems. The doors of its churches hold the traveler fixed in front of them. Its towers rise to the sky like things not made with hands. Its streets are guarded by silent sentinels that have stood there through ages. Its great houses stand as if they were built forever. Its walls are hung with pictures that Time will not let die. Like awaking from a dream it is to turn away from Florence and step into a train; like walking through five hundred years, from one world to another.

WHERE THE BONES OF ST. ANTHONY LIE



The Basilica of St. Anthony is the most famous of Padua's famous churches. In a chapel in this church, richly ornamented with carved marbles, the work of several famous artists, the bones of the Saint were laid away. The Basilica was begun about 1230 and finished in the following century.

THE BEAUTIFUL CITY OF THE DEAD IN GENOA



Italy is famous for the beauty and interest of its cemeteries and this is one of the most famous of them all, the Campo Santo Cemetery in Genoa. The Italian people take so much pride and delight in the cities of their beloved dead that the famous French writer, Bazin, calls them "funereal pleasure grounds." Of the parts of the cemetery occupied by the tombs of the wealthier Genoese, he says: "Nowhere is the stone made so supple, required to represent so many family scenes, so many trained and ruffled gowns with marvelous imitations of lace. These Italian cemeteries are like a great album of departed generations." On the tombs are frequently kept burning "tall night lights in colored glass; and always the bust, with spectacles, if the dead man wore them; or the photograph, framed and protected by glass."

Around Giotto's tower the city lies. Around the shepherd boy's immortal monument, Florence has grown up, as it were, in the bottom of a basin, and majestic hills wind round about it as if to defend it from the ordinary world. We look up at his great white tower and think that surely nothing lovelier has ever risen from the ground.

The foot of this tower, says John Ruskin, is the one spot out of Palestine where, if we know anything of the world's history, we feel the dawn of the morning of the world. Behind us is the last building set up on earth by the men who learned their work from Pagan teachers. In front of us is the best building set up on the earth by the men who learned their work from Christian teachers. Something like that John Ruskin said, and somehow it seems, even to the ordinary passer-by that there is something of the wonder of Dawn in the Lily Tower.

It rises in the heart of Florence, straight from the street where the children play, and it climbs up towards the clouds. It seems to us, as we look up at it, that it rises to the height of the mountains all around, and it is inseparable from any vision of Florence that we can have, or that any man has had

for 20 generations. If we are young and not tired, perhaps we run up to the top of the tower; but it is 276 feet high, and perhaps we are content to go a little way and look out through the open windows to get that lovely peep of Florence through the niche where John Ruskin loved to look down on it. Or perhaps we are content to stand below and let our eyes run slowly to the top. A hundred things there are for the eyes to rest upon, from the little sculptured pictures of the history of the world just above our heads, to the stars in the blue domes at the top, which shine at night like stars in the sky.

Those who love a human story stop again and again to look at the picture of Giotto's dog, the little friend who helped the shepherd boy to find his sheep, whose comradeship in the fields Giotto never forgot, so that when he came to build this tower and to chisel these pictures round it, he chiseled the picture of his dog and put the faithful creature there for all to see, although of himself he set down not so much as a mark or a name.

We shall be eager to pick out, also, those great statues by Donatello, who helped to furnish Giotto's tower as he helped to build Brunelleschi's dome. It

was Donatello who dropped Brunelleschi's dinner when he saw a statue his friend had made more lifelike than his own. But he pleased himself at last, and here, high up in Giotto's tower, stands one of his figures in particular, with which it is said he was so pleased that when he put down his chisel he slapped the statue lightly, pretending to be angry with it, and said, "Speak!"

Beside the tower stands the Duomo, the great cathedral of Santa Maria del Fiore, which looks plain in pictures because of its straight lines, though its thousands of pieces of black and white marble make an impressive and majestic mosaic. The front is modern, belonging to our own time, but the cathedral behind it goes back to the days when Giotto was building and Dante was writing, 600 years ago. The great bronze doors, with Bible mosaics above them, are almost perfect things; but it is the beautiful dome that Brunelleschi made, to which he gave many years of his life, and then died before it was finished, that crowns the great

cathedral. We look down on it from every hill round Florence; it shares the glory of Giotto's tower.

Across the street from the cathedral, behind us as we look up at the tower, is the baptistery, the quaint old cathedral built before England had won her Magna Carta, where, for more than a thousand years, every child of Florence has come to be baptized. The old cathedral has been replaced by the new, but nothing new can ever replace its three pairs of bronze doors—especially the two modeled and cast by Lorenzo Ghiberti.

The sun has been shining on them, the rain has been pouring on them, for nearly five hundred years. In the open streets of Florence they stand, perhaps the most famous gates in the world. Ghiberti first

spent 20 years in making the pair which stand in the north side of the building, and when it came to the casting he set up a furnace in a little street close by and obtained for his workmen permission to carry lights about the streets at all hours of the night. When these doors were finished they excelled anything of the sort the world had ever seen. After

that Ghiberti set out to work for 27 years more, and produced his second pair of doors, which face the great cathedral across the plaza. They surpass his earlier gates as much as those excelled anything else in the world. A few years later there lived in a house near by a child whose name was Michelangelo; and when he had grown up and become the greatest artist of them all, Michelangelo passed these gates and declared them "fit to be the gates of Heaven!" (See Ghiberti.)

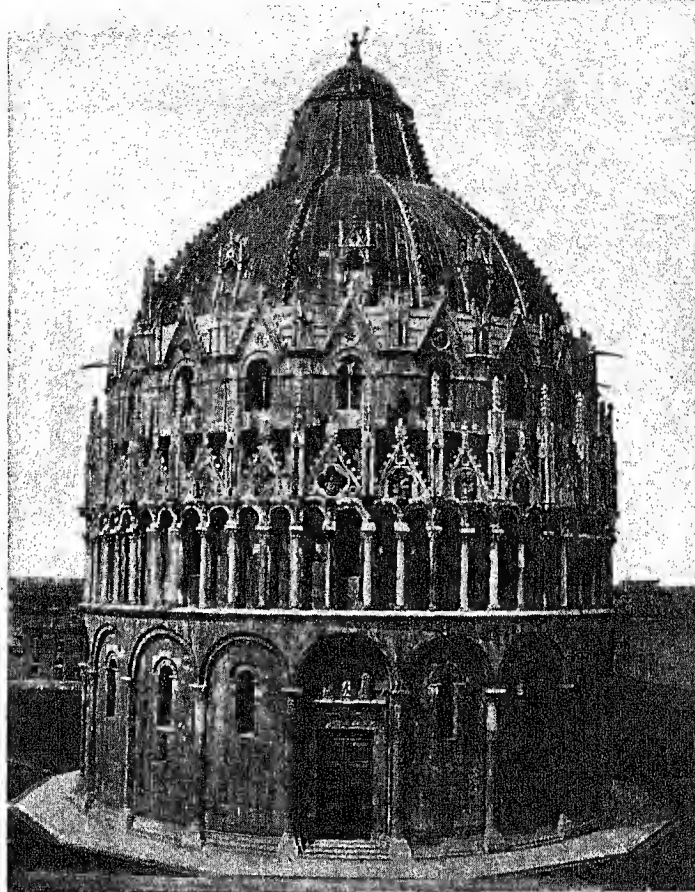
All these things are round about us. Standing in one place we look upon the baptistery, the cathedral, and the tower; and not more than a few minutes away from us, in front or behind, to right or

to left, are houses and churches and monuments, palaces and museums, which we could visit for weeks together without tiring of their wondrous beauty.

There are not many houses in the world like the great Strozzi Palace, rising from a narrow street on boulders so big that they remind us of the pyramids, and looking as if it would stand unmoved in its place as long as Time shall last. We turn back again and again to look at this great house, 400 years old and more, with some of its boulders ten feet long.

There is not anywhere, perhaps, a more beautiful courtyard than that of the Bargello Palace, once the home of the chief magistrate of Florence. Its glorious stairway, open to the sky, is one of the things that no visitor to Florence can fail to see. Nor is there

THE BAPTISTERY AT PISA



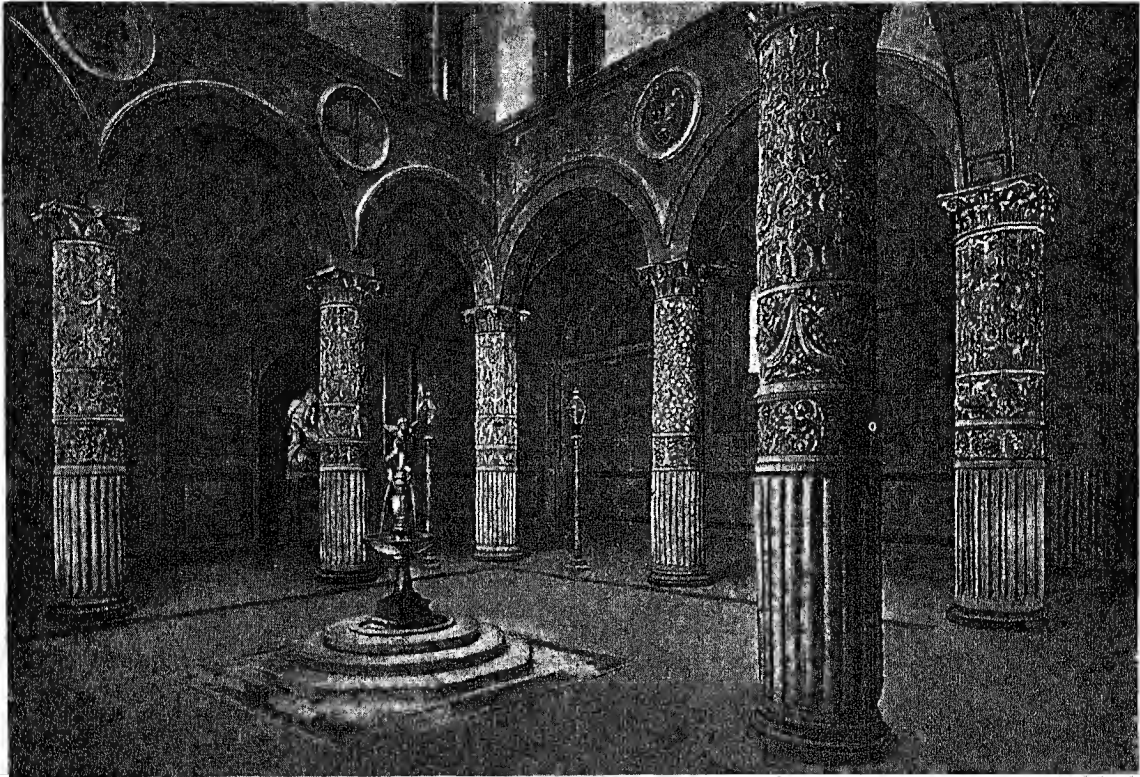
The Baptistery at Pisa is a circular building 100 feet in diameter. On the cone-shaped dome is a statue of St. Raniero. It was begun in the 12th and completed in the 13th century.

anywhere else another building like the Palazzo Vecchio (Old Palace), a battlemented castle which was once the seat of government for the republic, then the residence of the Medici dukes, and now the town hall. Six hundred years ago and more the dream of this place came into the mind of Arnolfo di Cambio, who half built it before he died.

Florence has two towers—the stern slender rugged tower of the Vecchio Palace, that looks almost as if it would fall, though it is like the rock of ages; and the great white tower by the cathedral, which

350 years ago. It was impossible, so his rivals said, to cast in bronze a statue so designed; and the triumphant artist, burning all he could lay his hands on, nearly killed himself in his resolve to melt the metal at any cost, and cause it to flow into the remotest part of the mold. Here also is the great bronze monument of Judith with the head of the tyrant Holofernes. No money in the world could buy from Florence these sculptures, which stand in the open street for the wind and the rain to beat upon and for every poor boy to see.

THE COURTYARD OF THE PALAZZO VECCHIO



The Palazzo Vecchio or "Old Palace" was built at the beginning of the 14th century to house the government of Florence. Today it is used as the City Hall. In contrast with the severe grandeur of the exterior, the courtyard of the palace is elaborately decorated in the later Renaissance style. Of special interest is the fountain in the center. The basin is of porphyry and the figure of a boy with a fish above it was made by the great sculptor Verrocchio. Above the colonnade are carved armorial bearings. The coat of arms above the pillar to the right is that of the Medici, who once lived in this magnificent old palace.

surely will never fall, though for its beauty and daintiness it is like the lily of the valley. And the first of these towers, rising from the Vecchio Palace, grows from the foundations that were planned by Arnolfo; the second was planned by the shepherd boy named Giotto.

We look up at the Vecchio Tower from the great square where Savonarola was burned to death. On our right is the prettiest of all those art galleries in the open air which are one of the beauties of Florence. It is the Loggia dei Lanzi, an open hall with a vaulted roof, where for many generations great solemn ceremonies have been held before the people. Here is the splendid bronze statue Benvenuto Cellini made

We pass from them between the two sides of the great Uffizi Palace, and at every step we are held by the statues which lie in this beautiful way—the two lines of figures, standing in the niches of the walls, of the great makers and dreamers of Florence. We look on them, and around us we look at their work, and we think ourselves back in the times when they lived; or perhaps our thoughts fly across the world home to America, for here—a surprising little discovery to make—is Americus Vespucius, who found America after Columbus, and after whom the continent was named. We pass beyond the statues, under the archway, into the famous Lung' Arno, the street by the Arno. And perhaps nothing strikes us,

as we walk along the river, more than this great Uffizi Palace, stretching from the Vecchio Palace behind us—through which we enter it—winding round the courtyard of the statues, following us down the Lung' Arno to an old, old bridge (the Ponte Vecchio), where it turns the corner and crosses to the other side. Then the Uffizi Palace veers round and rambles in and out of narrow streets, past a lot of little houses, climbing up and diving down, till at last it reaches a sort of park, with the most amazing evergreen ways, most spacious gardens laid out by the Medici, with fountains and statues and a great amphitheater, until it becomes a palace indeed, having joined the Pitti Palace beyond the river, with wide staircases, carved ceilings, and huge chambers full of treasure, with a front as big as the White House, and fifty times more noble.

Florence, A Great Museum

Florence is the Out-of-Door Museum of the World. If we can think of a museum as a town which has come together naturally, in a valley surrounded by hills, on the banks of a river, with not a glass case in it and not a single label stuck on, but with everything in its place and as it should be; not holding its head high with the pride of a stiff museum, but looking like what it is and what it was meant to be—if we can think of this, we can think of something like Florence, the richest gem, as somebody has called it, in the diadem with which the Italian people have adorned the earth.

Even out-of-doors Florence is almost inexhaustible to the traveler who can never stay long. Even in the streets we can stand and see the terra-cotta medallions of lovely children by Andrea della Robbia, whose matchless figures are still fresh in their blue and white on the front of the Children's Hospital; and for bronzes and marbles and carvings out of doors, no other place on earth can equal this.

In the great squares and streets of this town we walk about enthralled, and one morning, when the sun is high in the heavens, we climb up the hills across the Arno, and walk about these fortifications built by Michelangelo to keep the Medici tyrants out. Round and round we climb until, half-way up the hillside, we reach the square from which a bronze copy of Michelangelo's David looks down—a famous figure, immortal in the history of art, standing in splendor on a hill above the ancient town. The marble original of this beautiful young giant stands in the Academy of Fine Arts on the other side of the Arno.

Florence from the Arno Hills

From this hill we look down upon the city, closely packed with its great stone houses and its narrow streets; and its towers and churches and monuments lie all before us. And wherever we look the eye comes to the dome of the cathedral, crowning the heart of the city as the hills crown its circumference. The perfect combination of Brunelleschi's dome and Giotto's tower must be seen to be believed, and to-

gether they breathe the whole spirit of Florence. Something there is in Florence that suggests its inner growth. It was born in the Roman days and the commerce of the Middle Ages brought it wealth. It grew through storm and party passion to be a self-governing republic. It rose out of the blinding mists of family feuds. Its streets rang with the battle-cries of Gueli and Ghibelline. It has the mark of the anger of Savonarola, of the power of Lorenzo de' Medici, of the simplicity of Giotto the shepherd boy. The traveler who goes to Venice first will be glad he came that way. It is like stepping out of a drawing-room, where everything is so neat and delicate that we must hardly breathe, into a dining-room of solid oak, where we can sink on a heavy couch and feel that the house will stand. The name of the Lily Tower must not deceive us. It does not mean something pretty and dainty and small and white. It means something great and pure and lovely—a very Galahad of architecture. Florence is made of big and heavy things, its palaces are built of bowlders, its streets are flagged with stone, its towers rise high with great, sharp red-brown stones that a hundred generations may live to look upon.

Regretfully we leave this city of a dream. As the train slows out the dome sinks down, the towers fade away on the plain, and Florence is a memory. The poetry of Dante is in its air. The tenderness of Fra Angelico is in its pictures. The strength of Michelangelo is in its forts. The ruggedness of Arnolfo is in its palaces. The humanity of Giotto is in its tower. The dreaming of Brunelleschi is in its dome. The magic of Donatello is in its marbles. The power of the Medici is in its walls. The purity of Savonarola is in its everlasting beauty. The truth of Galileo is in its everlasting hills.

Florence holds the traveler like a magnet, but still there lies before him that city like a dream up in the north—Venice. How should one write of Venice?

The Wonderful City of Venice

Venice is a city—for centuries a widespread empire—that has grown up on the dust of the Alps, brought down by the rivers and cast into the sea. Into these islands formed in the lagoons of the Adriatic men drove huge piles, upon which they built magnificent palaces and churches.

They went on building until the islands were crowded, until scores of islands were linked by hundreds of bridges; and this wonder-city, rising from the sea, with the waves beating all around it, with the sea surging through its streets and into its houses at every highest tide, served as a central magnet, attracting to itself great dreamers and workers from the cities around.

Its commerce covered the Mediterranean and reached to the heart of Asia on the east and to the farthest limits of Europe on the west. Here came painters and sculptors and poets and preachers and builders and workers in mosaic, such as never before came together in the history of the world. Here,

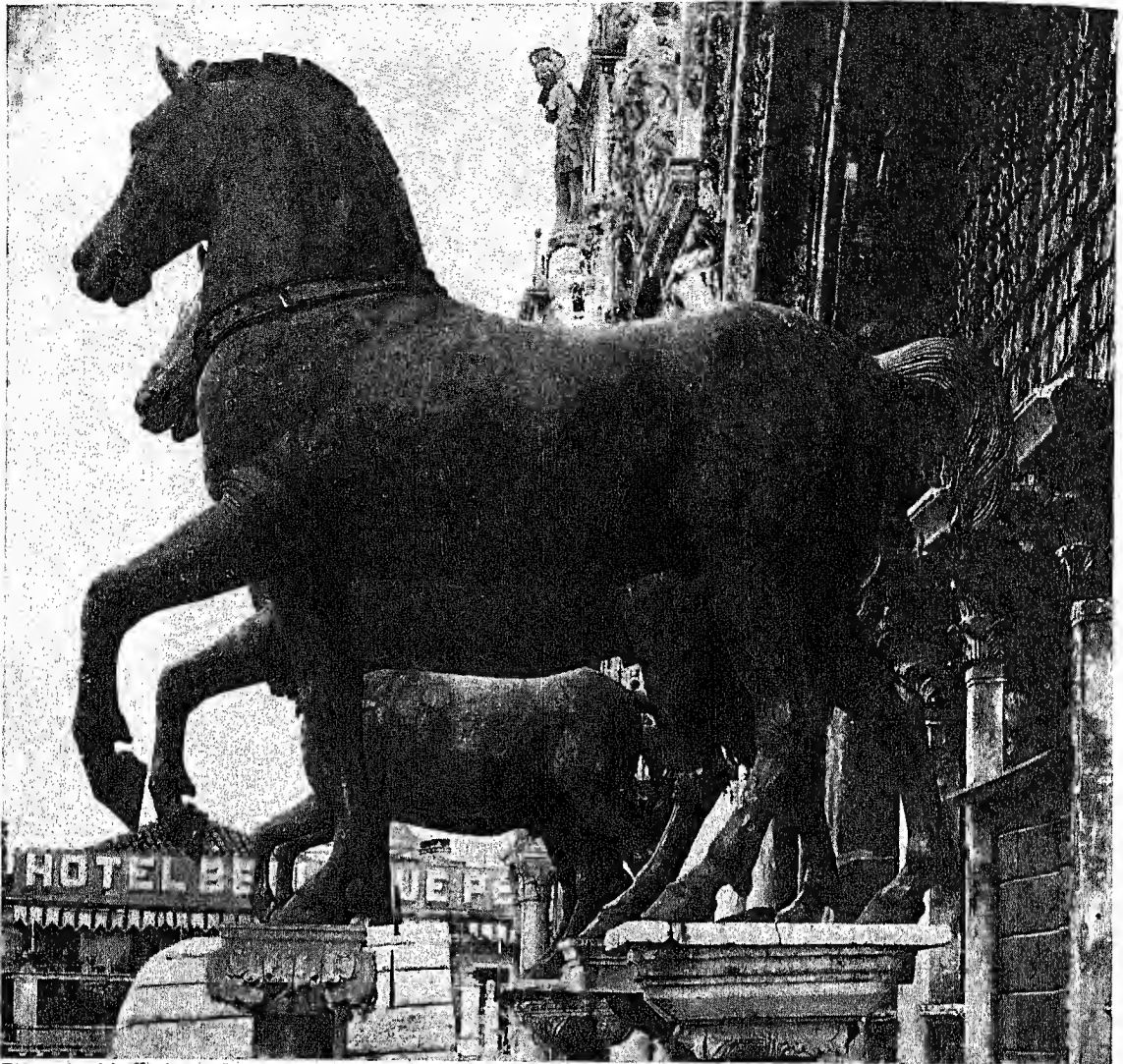
YESTERDAY AND TODAY RUB SHOULDERS IN ITALY



1. Two cypresses guard the village church at Oria on mountain-girl Lake Lugano, which lies partly in Italy and partly in Switzerland. 2. This Roman theater is part of the ruins of Hadrian's villa in Tivoli, a suburb of Rome. The gardens, baths, terraces, and statues of the magnificent villa covered acres, and many of the famous places in the provinces were reproduced in miniature 18 centuries ago. 3. As Pan piped, so pipes this Calabrian boy in his fur jacket. 4. Now the city hall, the 14th century Palazzo Vecchio in Florence once housed the government of the Florentine republic. Savonarola was imprisoned in its tower. 5. The Arms of Venice, showing the winged lion of St. Mark

with his paw on an open book and the motto, "Peace to you, Mark, my evangelist," surmount the balcony on the side of the Doges' palace in Venice. The Palace of the Doges, or Ducal Palace, dates from the 14th century, when Venice was a world power. White stone and red marble are laid in a diamond pattern over the upper story, supported on decorated columns. 6. The monastery of St. Francis, with its two churches, was built in the hill town of Assisi in 1228, two years after the death of St. Francis, and contains the crypt of the saint. Art treasures in the churches are delicately colored frescoes by Giotto and Cimabue. 7. Sardinian women bake bread in outdoor ovens.

NO HORSES EVER TRAVELED FARTHER THAN THESE



There stand in Venice perhaps the most famous horses in the world. Four of them, in bronze, stand over the central portals of St. Mark's looking out upon the square. They were made at Corinth nearly 20 centuries ago. Nero took them to Rome, Constantine to Constantinople; thence they were moved to Venice. Six hundred years later they were carried by Napoleon to Paris. After Napoleon's fall, the horses were returned to St. Mark's, but during the first and second World Wars they were taken down again.

even long after the political and commercial ruin of Venice, came Byron and Browning, and Ruskin and Wagner. Here lived Tintoretto, one of the "five supreme painters"; across the little canal is the church where he lies. Here lived Paul Veronese, painting immortal poems of beauty on the walls of Venice. The central glory of this place is St. Mark's Cathedral. The apostle Mark was a humble man, but he is represented as a lion today and he lies in a veritable palace—if, indeed, his body is here. Within a foot or two of the tomb stands a screen made up of gems worth millions of dollars. Beyond it stand two pillars of transparent alabaster said to have come from Solomon's temple. We enter through one of the six great doors, and we see that St.

Mark's is laid out in the form of a cross. It is not so big as the Milan Cathedral, which holds 40,000 people; but its arches and altars and numerous domes take our breath away. The upper half of the interior is covered with beautifully colored mosaic. Half-inch by half-inch these almost countless scenes in the life of Christ were built up. These wonderful mosaics cover an area of nearly 50,000 square feet and some of them are nearly a thousand years old.

It may be true that no horse's hoof has ever been heard in the city's streets, yet there stand in Venice perhaps the most famous horses in the world. Four of them in bronze stand over the central portals of St. Mark's, looking out upon the square; and on another sits the noble warrior Colleoni.

As for Colleoni's horse, John Ruskin called the statue the noblest equestrian monument ever set up on the face of the earth. It stands on a great high pedestal by the Church of St. John and St. Paul; these two great monuments—the church with its great men sleeping, the horse with its rider sternly gazing over Venice—have been side by side for more than 400 years. Bartolommeo Colleoni, a general of the Republic, sleeps at Bergamo, but he left his fortune to Venice in return for a statue in one of its squares, and it was Andrea del Verrocchio, one of the great sculptors of Florence, who was entrusted by the Republic with the carrying out of this commission.

Verrocchio went to Venice to make the statue there, and the story is told that he had just modeled his horse when he heard that the government of Venice meant to ask a scholar of Donatello to set the rider on the horse's back. Verrocchio was indignant. He broke his horse's head to bits and went home to Florence, and there followed him a decree forbidding him ever to set foot in Venice again under penalty of death. But artists can always laugh at governments; they have a power that politicians know not of. Verrocchio smiled at the decree of the proud Republic, and wrote back that he would never run that risk, as, if his head were once cut off, the government of Venice could never put it on again, while he could at any time replace his horse's head. The government of Venice felt that this was true. They canceled their

decree, begged Verrocchio to return, doubled his fee, and promised to leave him alone at his work.

He came back to Venice, and resumed his work; but he had barely completed his model when a sudden and violent illness carried the artist to his grave. He left behind him an appeal that one of his pupils should be employed to east his work in bronze; but Venice chose Alessandro Leopardi; and so we owe to these two men—Leopardi of Venice and Verrocchio of Florence—the carrying out of a monument which, once seen, has never been forgotten.

GIOTTO'S NOTED

SHEPHERD DOG



Jabal, "father of such as dwell in tents and of such as have cattle," is shown in one of 28 bas-reliefs representing the growth of industries and institutions on the campanile in Florence. Carved by Andrea Pisano from a design by Giotto this relief is popularly believed to show the shepherd dog which served Giotto as a boy.

They set up the statue overlooking the Grand Canal, and there, high up on its beautiful pedestal, this noble horse has borne its rider, watching the centuries in and watching them out. It has been the admiration of all the traveling world, and the heroic and helmeted figure of Colleoni, in his armor as a leader of troops, is one of the great figures that have come down to the modern world from the times before Shakespeare wrote of these waters that ripple past the square, and of Shylock who haunted the Rialto elose by. He sits as if he were the guardian of the glory of the world, and indeed he is.

Unequaled on the earth is Italy, land of wonders old and new, with treasures of which not half the

splendor and the glory has ever yet been told. The spirit of many centuries lies beneath the surface of modern life, for everywhere are there evidences of the age when Italy was the center of the world.

—REFERENCE-OUTLINE for Organized Study of ITALY—

ITALY, with its commanding position in the Mediterranean Sea, dominated the world in the days when the Mediterranean was the center of civilization. After the break-up of the Roman Empire, Italy remained prosperous, and retained its leadership in culture despite the fact that political supremacy passed to northern Europe. It became in the Middle Ages and later the home of numerous city-states and principalities, many of which continued to thrive despite intrigue, civil war, and foreign invasions, until Italy became a unified nation in the 19th century.

Industrially Italy is greatly handicapped by a scarcity of natural resources. The lack of coal has led to the rapid development of water power to supply fuel for the many manufactures which are being encouraged by the Fascist government. The commercial advantages

which the country owes to its many excellent seaports and to its position along the highways of trade between Europe, Africa, and Asia, promise to become increasingly important, as the resources of the Near East and the nation's African possessions are more fully developed.

The development of Italy's colonies has become imperative because of the crowded condition of the country. Fascist restrictions on emigration have made more acute the problem of feeding the people. A program for colonial expansion led in 1936 to the annexation of Ethiopia. This empire and the colonies of Eritrea and Italian Somaliland now constitute Italian East Africa.

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IVAN, GRAND DUKES AND CZARS OF RUSSIA. Six rulers of Russia have borne the name "Ivan," the Russian for John. Some of them ruled before the country was called Russia, and they were known as the Grand Dukes of Moscow. The foundation of the modern state of Russia was the work of the third and fourth rulers of the name.

IVAN III, who ruled from 1462 to 1505, freed his country from the Tatars by refusing to pay tribute to the Great Khan. He conquered the wealthy city of Novgorod and annexed it with many other cities and states to his dominion. He took the title of emperor and adopted the double-headed black eagle as the Russian arms. Because of the importance of his work he is known as "Ivan the Great."

IVAN IV, during his reign from 1533 to 1584, earned the title of the "Terrible" by the insane cruelty he manifested at times. Once in a fit of anger he even killed his own son. But Ivan IV, like Ivan the Great, was also a man of great power. He extended his dominions south to Astrakhan on the Caspian Sea and north to the White Sea, and on the east he added

Siberia. In 1547 he formally took the title of Czar (Caesar), and laid the foundation of the autocratic government under which Russia was ruled for nearly four centuries. He gathered about him men of power but of humble origin.

IVORY. As the greatest prize of the miner is gold or gems, so the greatest prize of the hunter is ivory. This useful and precious substance is the dentine which makes up the tusks of elephants and a few other animals. From ancient times ivory has symbolized adventure and danger as well as luxury, for hunters must penetrate the wildest jungles of Africa and Asia to get the best grades of elephant ivory.

In the ivory trade, elephant tusks are called teeth. This name properly belongs to them, for they are the animal's upper incisors. (See *Elephant; Teeth*). Tusks may grow to a length of 11 feet and may weigh 200 or 235 pounds apiece. But such sizes are unusual; the average weight of tusks in an ivory shipment rarely exceeds 55 or 60 pounds. The bark, or exterior, of a tusk is often dark; the interior is white or cream-colored, and of a beautiful grain.

ON STOUT BACKS THE IVORY GOES DOWN TO THE SHIPS



By jungle trail, these tusks of ivory have come from elephant hunters' huts in East Africa to Mombasa, leading port of Kenya Colony. So many thousands of elephants are killed every year for their ivory that these giant beasts are fast being wiped out in Africa. Even so, most of the ivory comes from native stores, and less than a fifth from elephants newly slain. Not a particle of the precious ivory is wasted in manufacture. Scraps are saved for inlays, and the dust is used for polishing and in India ink.

The African elephant supplies most of the ivory for such large marts as London and Antwerp. Its tusks are much larger and the ivory of a better quality than that of the Asiatic elephant (see Elephant). Millions of these animals have died at the hands of ivory hunters. African elephants are protected from indiscriminate slaughter in most of their favorite haunts today, with the result that much of the ivory that reaches the market now comes from old stores long ago accumulated by tribes of the interior. Only about 20 per cent is what is called "live" ivory from animals recently killed. If the old ivory has been suitably stored, its quality may be as good as the live ivory.

Because of its soft-toned, fine-grained texture and its elasticity, ivory is a specially good material for the use of the artist and engraver, and also for the manufacture of piano keys, billiard balls, combs and toiletsets, handles for knives and umbrellas, and many other articles.

Small quantities of ivory are also obtained from the hippopotamus, narwhal, walrus, and other animals in which teeth and tusks are prominent features. In addition vast stores of fossil ivory are preserved in more or less perfect condition in the frozen tundras of Siberia, Alaska, in Colombia, South America, and other regions. Much of this ivory is the tusks of the mammoth, the predecessor of the elephant, which existed in countless numbers thousands of years ago.

The use of ivory can be traced to prehistoric times. The early cave dwellers executed figures of animals on tusks, bones, and horns. There still exist examples of inlaid Egyptian ivory, and in the British Museum are many Assyrian ivory carvings made in Nineveh nearly 1,000 years before Christ. We read that King Solomon had "a great throne of ivory." In ancient Greece ivory was used for carvings, sculpture, and various objects of luxury. The sculptures in ivory of the Gothic art of the 13th and 14th centuries are distinguished for their beauty. Ivory mirror cases, caskets for jewelry or toilet purposes, and other articles were carved with scenes from real life or illustrations of the romances, which set forth vividly the dress and customs of the times.

Vegetable ivory, a material resembling ivory, is obtained from a palm native to tropical South America which throws up beautiful leaves like ostrich feathers, 10 to 30 feet high. The fruit, about as large as a man's head, contains numerous nuts or seeds, called corozo or tagua nuts, which when ripe are so hard that they make a valuable substitute for ivory. They are much used for buttons (see Buttons), umbrella handles, and similar purposes. There are also various artificial compounds such as celluloid, which make excellent substitutes for ivory. (See Celluloid; Pyroxylin Products.)

IVY. About 50 comparatively hardy vines growing in moderately cool regions of the northern hemisphere, which botanically differ rather widely from one another, are called by this name. They climb by means

of sucker-like disks which attach themselves to walls and trees or by means of close twining tendrils. The waxy dark-green leaves of the common or English ivy turn to vivid hues of scarlet and yellow in the fall, as do those of most other varieties. The small greenish flowers are succeeded by smooth black or yellow berries. Contrary to common belief, ivy does not ordinarily injure its means of support. A fair growth of ivy on sound walls promotes dryness and warmth, reduces weathering, and adds beauty. However, an excessively heavy growth upon a tree may strangle it.

The ivy has always been a symbol of the clinging love of woman. The altar of Hymen, the Greek god of marriage whose blessing was invoked at every wedding,

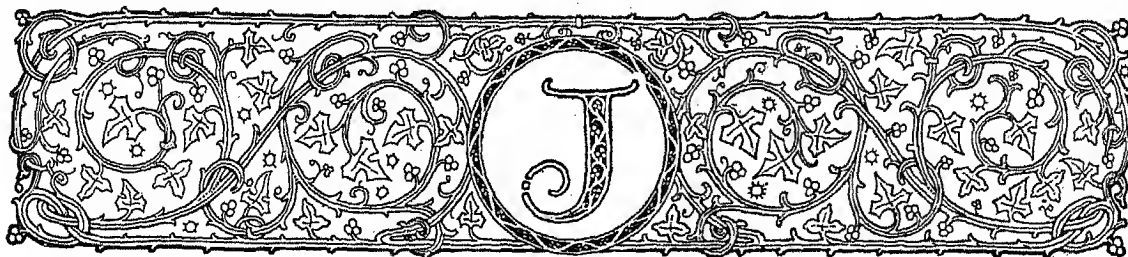
was kept green with ivy. When Isolde, in the old Irish legend of Tristan and Isolde, immortalized in Wagner's opera, died lamenting the death of Tristan, King Mark, in his anger, buried them apart; but an ivy growing from the breast of Tristan met another growing from the grave of Isolde, and the two vines, entwining, convinced the King that the union of the lovers was pure and undying and caused him to repent of his anger and bury them together.

In addition to the common or English ivy (*Hedera helix*), there are the African or Irish ivy (*Hedera canariensis*), which is the common large-leaved climbing ivy; the Japanese or Boston ivy (*Parthenocissus tricuspidata*), a graceful, easily kept vine; the Virginia creeper (*Parthenocissus quinquefolia*), often wrongly called woodbine, with 5-lobed leaves. The North American poison ivy (*Rhus toxicodendron*) resembles the Virginia creeper but has 3-lobed leaves poisonous to the touch; it is really a sumac. The ground ivy (*Nepeta hederacea*) is a creeping plant with bluish-purple flowers.

IVIES—GOOD AND BAD



The 5-lobed Virginia Creeper at the left is a harmless and beautiful green or scarlet creeper. But the climber at the right is the dangerous poison ivy which gives many people burning blisters wherever it touches them. Play safe by counting the leaves before you handle ivy. Remember, the 5-lobed one is safe, the 3-lobed one is poisonous.



JACKAL. Southern Europe, Asia, and northern Africa are the home of the jackal, a doglike animal smaller than a wolf and of less savage habits. It has a pointed muzzle, like a fox, and a bushy tail about one-third the length of the body. The common jackal of southern Asia is the best known. It is grayish yellow in color, darker above and lighter on the under side.

During the day jackals remain concealed in burrows, caves, and jungles, coming out at night to hunt, usually in large packs. They utter a piercing unearthly cry, and the howling of a pack at night makes an appalling chorus, familiar in oriental villages. They feed on smaller mammals, poultry,

fruits, and especially carrion, quarreling over the latter with the vultures. They shadow wounded animals and haunt battlefields and burying-grounds. When running in packs they often attack sheep and antelopes. They are easily tamed, and probably represent one of the breeds from which the domestic dog is descended. Jackal hunting with foxhounds is a popular sport in India, as these animals are cunning and fight furiously when cornered.

Scientific name, *Canis aureus*. The jackal resembles the wolf and dog in its teeth, round eyeballs, and to a large extent in its habits. The range of the common jackal extends from Dalmatia to India. Like the fox it has an offensive odor due to secretions of a gland at the base of the tail.

The FRONTIERSMAN Who Became PRESIDENT

"Old Hickory," a Product of the Wilderness Who "Kept His Bark On"—His Forceful Character and How He Rose to Power as Spokesman of the West

JACKSON, ANDREW (1767-1845). When Andrew Jackson came upon the stage of American political affairs as the seventh President of the United States, a new era began in the history of the country. The control of the government by the "Virginia dynasty" and the Adams family was at an end, and the rule of the frontier had begun.

As a specimen of the new type of American manhood which was now to dominate the country, no better person could be found than Andrew Jackson. The son of Scotch-Irish parents who had settled in the frontier wilderness of the Carolinas shortly before his birth, he displayed the characteristics of the Waxhaw region in which he was born and reared. He was uneducated, crude, and fond of fighting; but energetic, self-confident, honest, and straightforward. Ardently loved by his friends, he was just as cordially hated by his many enemies—a hatred which he abundantly returned.

Jackson's lack of education was due not only to the poor schools on the frontier, but also to his own indifference to books and to his unwillingness to be taught. He never learned to speak or write correct English, and one of his enemies once said that "his letters, with their crudities in spelling and grammar, would make the better educated angels weep."

During his whole life Jackson could wield the sword more readily than the pen. Tradition tells that of

all the wild boys of the neighborhood he was the wildest, and that he was proverbially ready for a quarrel, a readiness which in later life involved him in numerous duels. When he was 13 years old he found a good cause for fighting, for South Carolina was overrun by the British, and young as he was he joined an expedition to drive them out.

At the close of the Revolutionary War, Jackson found himself alone in the world, for his two brothers had been killed and his mother had died as a result of the hardships she endured nursing American prisoners. After trying several occupations, Jackson studied law and learned enough to be admitted to the bar in 1787. For the position of prosecuting attorney in Nashville, which he accepted in 1789, he had precisely the characteristics needed. Courage was the chief requisite, for offenders often came to court supported by bands of their friends. Jackson possessed plenty of both moral and physical courage, and though impatient of restraint himself, he was quite as determined to make other men obey the law, a resolution which won for him the esteem of the law-abiding and the respect of evil-doers.

These qualities soon gained him recognition as spokesman of the West. He was member of Congress at 29, United States senator at 30, judge of the Supreme Court of Tennessee at 31, and major-general of militia on a dangerous frontier at 35.

When Jackson entered Congress in 1796 the aristocratic governing class of the East looked with disgust upon this grave backwoodsman. One noted his uncouth dress and manner, his hair done up in a queue with an eel-skin; and Jefferson declared that his "violent passions choked his utterance" whenever he attempted to make a speech. Jackson evidently cared no more for the people he met at the national capital than they did for him, or perhaps he recognized his unfitness for a position among the dignified members of the Senate. At any rate he resigned in 1799, to return to Tennessee as a justice of the Supreme Court of the state.

Enter the Hero on Horseback

When Jackson next appeared in national politics he came as a military hero and the popular idol of the West. He had offered his services at the beginning of the War of 1812, but his two great victories in that conflict were irregular. The one on March 27, 1814, over the Creek Indians at Horseshoe Bend, Ala., was really a campaign of the states of Tennessee, Georgia, Mississippi, and Alabama, and not a part of the Federal operations. His greater victory at New Orleans, on Jan. 8, 1815, was gained after the treaty of peace was signed, but before it was known in America. His victory over the Indians had important results, for it broke the power of the redmen in the Southwest, and gave America a chance to concentrate her forces for the conflict with England. The victory at New Orleans did not have any bearing on the results of the war, but it was regarded by the people of the country, especially of the West, as having removed the danger of foreign control of the Mississippi River. In some sections of the country "Jackson Day," January 8, was long a Democratic festival.

Jackson always went straight for what he wanted. This characteristic sometimes involved him in difficulties, as it did in 1817. He had been ordered to the Florida frontier where the Indians were massacring the American settlers. Jackson, with many others, felt that the redmen were incited to these raids by the British and the Spanish. As a frontiersman he hated the Indians. Because of the ill-treatment he had received while a prisoner during the Revolutionary War, he hated the British; and as a Westerner he disliked the Spanish because they frequently closed the Mississippi River to American commerce. His hostility to these three peoples made the expedition to Florida an especially agreeable one to Jackson. Without waiting at the frontier for further orders, he crossed into Spanish territory, captured Saint Marks, and there hanged as spies two British subjects. This high-handed proceeding naturally raised delicate diplomatic questions between America and England and Spain. It led to a proposal from Calhoun, then secretary of war, that Jackson be censured for exceeding his orders. Nothing came of the proposal, except the life-long hostility of Jackson to Calhoun.

However much his actions may have embarrassed the government at Washington, they only served to

make Jackson more popular in the West. Nor was this popularity lessened by his arrogant conduct while governor of Florida, after that territory had been purchased in 1819 from Spain. Instead it increased until, in 1824, he became one of the five candidates for the presidency. Though he received more of the electoral votes than any of the other candidates, he did not have a majority and the choice therefore went to the House of Representatives. In that body Clay's followers, realizing that their leader could not be elected, gave their votes to John Quincy Adams, who in consequence was elected. When Adams appointed Clay as his Secretary of State, Jackson was convinced that he had been cheated out of the presidency by a "corrupt bargain" between his two rivals. Many agreed with Jackson, although there was no ground for this charge; and the feeling that he had not been treated fairly, together with the dislike many felt for the cold uprightness of Adams, and their admiration for Jackson, gave him the election in 1828 as a Democrat by an electoral vote of 178, to 83 cast for Adams as a "National Republican" (Whig). It should not be forgotten, also, that Jackson's campaign was very skilfully managed by his friend and adviser, William B. Lewis. John C. Calhoun of South Carolina was reelected vice-president but soon resigned owing to strained relations with Jackson.

The Spokesman of the Common People

The common people felt that at last they had an executive who was one of them, as was shown by the appearance of the crowds at Washington on inauguration day. Half the men wore their trousers tucked into their boot-legs and not a few carried pistols openly in their belts. The contrast between "Jeffersonian democracy" and "Jacksonian democracy" is indicated by the contrast between Jefferson's mansion at Monticello, and the backwoods log cabin in which Jackson spent his youth.

Jackson regarded himself as a spokesman for the common people, in whom he had absolute confidence. This belief he expressed in the phrase "Let the people rule," and in order to let them "rule" he removed from office in the first year of his administration about 2,000 office-holders to make room for his friends. This was an application of the hurtful "spoils system," with its cry, "To the victor belong the spoils," which flourished and corrupted American politics for more than half a century and which civil service laws have not yet altogether removed.

This same hatred for anything resembling class privilege led Jackson to attack the Bank of the United States. He vetoed the bill granting the bank a new charter, and declared its control of the country's money was a menace to business and to democratic government. The election of 1832 was fought on the issue of "Jackson or the Bank," and Jackson won by a large popular vote (219 electoral votes to 49 for Henry Clay). Martin Van Buren of New York was chosen vice-president.

Jackson took his reelection as a verdict against the Bank from the supreme authority of the country—the people; and although the Bank's charter still had three years to run he directed that the government funds should be taken from it and deposited in "pet" state banks. The "dying monster," as Jackson called the Bank, fought savagely, but in the end it was defeated and was compelled to transform itself into a state bank of Pennsylvania.

The banks which had the use of the government funds began to issue paper money in enormous quantities, and the wildest speculation followed. Then suddenly Jackson, in 1836, issued his famous "specie circular" declaring that the government would accept only gold or silver in payment for public lands. At about the same time he called upon these banks to give up the money which had been deposited with them, so that he might lend it to the states. The result was a disastrous panic, but since it came upon the country just after Jackson left office, the blame for it fell upon his successor.

Although Jackson was such an opponent of all forms of control by the "few," he was one of the most despotic presidents the country has ever had. He usually ignored his cabinet officers, and sought advice from a little group of friends which became known as the "Kitchen Cabinet." He enlarged the power of the President in his relations with Congress by freely vetoing bills. His six predecessors taken together had vetoed nine bills. Jackson vetoed 12, besides using the "pocket veto" freely, by quietly letting bills die that reached him within two days of the end of a session.

He also increased the influence of the executive by the firm position he took in a conflict between South Carolina and the government of the United States. South Carolina objected to the tariff law of 1832, and issued an ordinance declaring that it should not be obeyed in that state. Jackson responded with a proclamation warning the South Carolinians of his determination to enforce the law—by the bayonet if

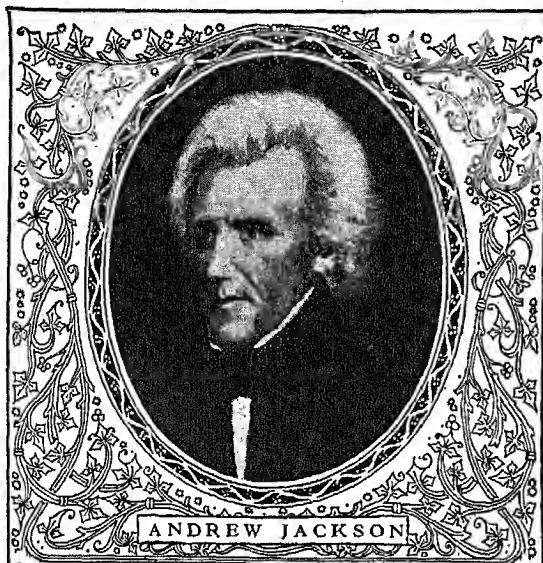
necessary. He had earlier announced his unalterable opposition to what is called "nullification" and "secession" by a famous toast which he gave at a banquet attended by South Carolinians: "Our Federal Union—it must be preserved." Jackson did, however, recommend to Congress that the tariff be revised, and the bill for this was passed on the same day that a "force bill" passed giving the President troops to compel obedience from South Carolina. The debate between Webster and Hayne, three years before, over the right of the states to thus set aside a law of the national government was one of the most brilliant ever heard in Congress. Immediately after the passage of the two laws South Carolina repealed her nullification ordinance.

Quite contrary to Jackson's firm stand in this question was his action when Georgia disregarded the authority of the United States. Georgia had passed a law regarding certain lands which by treaties had been given to the Indians. The Supreme Court of the United States declared that this state law should not be enforced. When a man was imprisoned by Georgia authorities for disregarding the state law,

President Jackson refused to use the executive power to uphold the decision of the Supreme Court. Instead he merely remarked: "John Marshall has made the decision; now let him enforce it."

One reason for Jackson's changed attitude was that he hated the Indians and was glad to see them lose their lands. Another was that he was largely guided by his feelings, and he disliked Chief Justice Marshall, the author of the decision in the Georgia affair, as much as he had hated Senator Calhoun, the defender of South Carolina.

When Jackson retired from office he had the satisfaction of seeing his chief points carried: the tariff question was regulated on his principles, the Bank of the United States was closing up its affairs, nullification was laid low, and the Indians in Georgia had been pacified. His satisfaction was increased by the fact that Van Buren, who had been rejected by the



JACKSON'S ADMINISTRATIONS

1829-1837

"Spoils" appointments to office (1829).

Webster-Hayne Debate (1830).

Garrison publishes 'The Liberator' (1831).

McCormick invents reaper (1831).

South Carolina threatens secession over tariff (1832).

Jackson's war on the Bank (1832-37).

Texas secedes from Mexico (1835).

War with Seminole Indians (1835-42).

Arkansas and Michigan admitted (1836, 1837).

Financial Panic of 1837.

Senate as minister to England, was his successor; and that Roger B. Taney, whom the Senate had twice rejected for lesser offices, was the Chief Justice who administered the oath of office.

During the eight years which followed Jackson's retirement, the hard times which came upon the country in 1837 hurt him financially and also disturbed his peace of mind. But they did not destroy his popularity. Admirers named their children for him and asked for his autograph; and so many wrote to request a lock of his hair that he kept the clippings whenever he had it cut. Neither Washington nor Jefferson enjoyed the popularity that "Old Hickory" did, nor have many presidents since his day possessed to such a degree the love and confidence of the majority of the people. He died at his estate, The Hermitage, near Nashville, Tenn., on June 8, 1845, and was buried in the garden.

JACKSON, THOMAS JONATHAN ("STONEWALL") (1824-1863). In the whole history of the War of Secession no figure stands out with more picturesque vividness than that of "Stonewall" Jackson. His earnestness of purpose and his religious determination to do the right as he saw the right, combined with his great military genius, made him a man admired alike by friend and foe.

His strength of will was probably the result of his sturdy Scotch-Irish descent, and of his fight with adverse circumstances. Left a penniless orphan at an early age, he learned to depend upon himself and secured an education by his own efforts. After attending a small country school in Virginia, he decided to go to West Point. He set out for Washington, traveling part of the way on foot, and when he arrived in the capital, he presented himself before the Secretary of War, and asked for an appointment to the Military Academy. The secretary was so impressed by the boy's determination that he immediately gave him the appointment. After his graduation in 1846 he served in the Mexican War and won such distinction that in seven months he was promoted from the rank of second lieutenant to that of major. After the close of that war he became a teacher in the Virginia Military Institute, and though he was not a success in the classroom, he left an indelible impress upon the negroes of the community, for whom he established a Sunday School and to whom he was unfailingly kind.

In 1861, when the quarrel between the North and the South came to a crisis, he threw in his fortunes with his own people. He wished to see the Union preserved, but he did not believe that the North should force the South to remain a party to a compact which had become hateful. At the battle of Bull Run, when some of the Confederates were thrown into confusion, one of their generals called to the men: "There stands Jackson like a stone wall; rally behind the Virginians." The cry was taken up by the soldiers, and "Stonewall" Jackson was the name by which he was known ever after that.

In the War of Secession Jackson's career more than fulfilled the promise given by his exploits in the Mexican War. Though he stood "like a stone wall" in battle his fame as a general rests chiefly on the rapidity with which he could march his men from one point to another, and strike the enemy where they were least expecting it. So rapid were his movements that his men became known as "Jackson's foot cavalry." In 1862 he conducted a famous campaign in the Shenandoah Valley in which he completely mystified the Federal commanders. At the battles of Fredericksburg and Antietam, by his sudden and unexpected appearance, he rendered valuable aid to General Lee. In May 1863, after winning the battle of Chancellorsville, he and his escort were mistaken in the dusk by his own outposts for a detachment of Federal cavalry. They were fired upon and Jackson fell mortally wounded. The loss of this brilliant general more than offset the Confederate gain in their victory.

While we remember Jackson as a great general, it is especially as an earnest and upright man that we admire him. On the march he always carried with him his Bible and Napoleon's 'Maxims of War'. To the study of the latter he owed his success as a general; to the study of the former his greatness as a man. He interpreted literally the injunction to pray without ceasing, and even on the battlefield his lips were often seen moving in prayer. The attitude of his men towards this characteristic of his is best illustrated by a poem written by one of his soldiers who lost his life in the Shenandoah Valley:

Silence! Ground arms! Kneel all! Caps off!
Old Blue-Light's goin' to pray.
Strangle the fool that dares to scoff!
Attention! It's his way,
Appealing from his native sod,
In *forma pauperis* to God:
"Lay bare Thine arm; stretch forth Thy rod.
Amen!" That's Stonewall's way.

JACKSONVILLE, FLA. Unlike many Florida cities, Jacksonville, the largest city in the state, has had a steady rather than a spectacular growth, because it has long been the "gateway" to the state. It is in the northeast corner, about 20 miles from the Atlantic, on the St. Johns River, Florida's largest navigable stream and the state's chief trade artery before the development of railroads. A 30-foot channel allows coastal and transoceanic shipping to reach the mile-long system of docks and terminals. The United States Navy has a great air base on the river about ten miles from the city.

Jacksonville is distinguished among American cities for the extent to which it has adopted the principle of public ownership of utilities. It owns its waterworks, electric light plant, radio station, airport, docks and terminals, cotton compress, and the world's largest naval stores yard. The soft mild climate brings numbers of tourists, but Jacksonville is essentially a "working" city. Among its chief manufactures are lumber and timber products, ships and

boats, paper and pulp, tile, brick, cigars, gas engines, and canned fish.

Now the hub of Florida's air, water, and railroad transportation, Jacksonville began as a ford, called Wacca Pilatka by the Indians, on the trail to St. Augustine. The town was laid out in 1822 and named for Andrew Jackson, the first territorial governor. It was incorporated as a city in 1832. Population, 173,065.

JACOBINS. This famous organization of French Revolution days was started modestly at Versailles in 1789 by the country members from Brittany who were attending the National Assembly. They were known as the Breton Club, and were at first essentially conservative, with a duke for a president. By and by other delegates not from Brittany were admitted; then men not in the Assembly became members. It was known now as the Friends of the Constitution. When the king and Assembly moved to Paris the club took up its quarters in an old disused monastery of the Jacobin monks and received its popular name from this meeting place. It organized a network of branches through the country to assist in preserving and defending the work of the Revolution. It was the chief nation-wide organized body in that period of turmoil and as such it helped to form public opinion. Gradually it became more and more powerful. The transfer to Paris had opened the membership and galleries to the radical groups in Paris. The more conservative members drew away from it or were expelled and formed other clubs. The flight of the king turned its whole influence against monarchy and in favor of a republic. The leadership passed to men like Robespierre and Danton until finally the word "Jacobin" came to mean a person of extreme revolutionary sentiments, much as the term "Bolshevik" is applied in our own day.

The Jacobin leaders at first opposed war with surrounding countries, then threw themselves into its prosecution and the propaganda that went with it. They confidently expected to catch the king and queen in intrigues with the Austrians and Prussians, and succeeded. In the fall of 1792 they engaged with the Girondists in a bitter struggle over the fate of the king, and the execution of Louis XVI was the result of the shrewder political game of the Jacobins. Their meetings now became, until the fall of Robespierre (July, 1794), more important than the discussions of the Convention itself. The club was closed in November 1794, but its membership both within and without Paris was influential in later events.

THE BIGGEST OF AMERICAN CATS



Suppose you should meet a spotted cat like this, measuring four feet from his nose to the root of his tail—would you stop to remember that he is a Jaguar, that he is an expert at catching fresh water turtles, that he lives all over South America, and other interesting things that are told in the article on this page?

JAGUAR (*jäg'wār*). This formidable beast of prey is the largest member of the cat family found on the American continent. The average length is about four feet from nose to the root of the tail. It is the

tiger of the New World and the third most powerful of the entire cat tribe. The head is noticeably large, the legs massive. There is much variation in its color, but in general it is yellowish brown with black spots like the leopard. The spots, however, are larger and more angular. It inhabits all South America, except Patagonia, and is occasionally found in North America as far as the Red River of Louisiana and the Medina River of Texas. It

abounds in the forests, especially along the Amazon, and is the dreaded foe of man and quadrupeds. Its terrific roars at night are enough to shake the stoutest nerves. It hunts both by pursuit and by pouncing on its victims from trees, and is expert at catching fresh-water turtles. Scientific name, *Felis onca*.

JAMAICA. With her dreamy palm-fringed coves and cloud-capped mountains rising out of the turquoise waters of the Caribbean Sea, Jamaica today, as in the days when Columbus exclaimed over its beauty, is a fairy garden blooming in perpetual summer.

But Jamaica (whose Indian name *Xaymaca* means "island of fountains") is not merely a tourist wonderland of fields flaming with orchids, iris, passion-flowers, poppies, and wild pansies; of sparkling streams and jungle-lands of palms, bamboos, and giant ferns, where cuckoos, humming-birds, parrots, and many-colored butterflies endlessly flutter. It is a land of rich commercial resources as well, with its luxuriant lowland plantations, its gleaming gold and emerald fruit trees; and its weird dusky mountain forests of moss-hung logwood, satinwood, mahogany, rosewood, and ebony. Trading for the most part with the United States, Jamaica exports chiefly bananas, coconuts, logwood (used for dyeing), logwood extract, sugar, coffee, rum, cocoa, allspice or Jamaica pepper (the berry of an evergreen tree), and her famous Jamaica ginger.

This largest and most important island of the British West Indies has special interest for the United States. It is a favorite winter resort because of its beauty and mild climate. Its strategic value is great, since it lies only about 550 miles from the Panama Canal and commands vital entrances to the Caribbean Sea. For this reason, the United States in 1940 obtained a 99-year lease of an area southwest of Kingston for a naval and aviation base.

Jamaica lies about 90 miles south of Cuba on the main ship route between the Panama Canal, and Europe and the Atlantic states. The island, 144 miles long, 40 miles wide, and with an area of 4,450 square miles (nearly as large as Connecticut), has many good harbors, of which Kingston, the chief commercial port, is the best. It was discovered by Columbus on his second voyage, in 1494, and 15 years later it was settled by the Spaniards. In 1655 it was conquered by an expedition sent out by Cromwell, and has since been a British colony. For a few years it was a pirate haunt.

During the 18th century more than 600,000 Negroes were imported to work the plantations, and the island was the chief slave market of America. After an uprising in 1831, slavery was abolished in 1833, but another Negro rebellion occurred in 1865.

Nearly all the people are black or of mixed blood. Only 2 per cent are white. There are many East Indians, imported for plantation work, and many Chinese. The colony has a governor appointed by the British crown, a privy council, and a legislative council. Population, about 1,175,000.

JAMES, KINGS OF ENGLAND. Only two rulers of England have borne the name of James. The hatred which was felt for the second of these, because of his attempt to rule despotically and restore the Catholic religion, is probably one reason why the name has fallen into disuse.

JAMES I, who was king of England from 1603 to 1625, was already King James VI of Scotland when he came to the English throne as the first of the Stuart line (see Stuart). He was the son of the unfortunate Mary Queen of Scots, and of her second husband, the feeble Henry Stuart, Lord Darnley (see Mary Stuart, Queen of Scots). Born in Edinburgh Castle in 1566, he became king of Scotland the following year when his mother was forced to abdicate. During his minority he was a prize to be fought for by warring lords who claimed the regency, and by contending French and English factions. In 1582 he was seized by the Earl of Gowrie and the Protestant party and held captive for a year. Upon his escape he began to govern in reality.

As a boy the young king was sickly, and he never outgrew a weakness of the legs which made it impossible for him to stand without support until he was

TYPICAL PRODUCTS OF JAMAICA



The bananas, the ultra-black negresses, and the broad-brimmed straw hats are all typical of this richly endowed British colony. The picture shows a typical "fruit-store"—a little space screened off in the market place, where the "merchant" sits and sells her wares.

seven. He became a bold rider, although for many years he found it necessary to be tied in the saddle. He was thoroughly educated, especially in theology, and although the son of a Catholic mother remained through life a staunch Protestant. But his large head and rickety legs gave him an ungainly appearance, and he had little of the dignity that befits a king. A foreigner at his court in Scotland once wrote: "He speaks, eats, dresses, and plays a boor."

When James succeeded to the English throne in 1603, on the death of Queen Elizabeth — his cousin "twice removed" — he was a man of 37 and prided himself on what he called his "kingcraft." In reality he so lacked political discretion that a French statesman once characterized him

as "the wisest fool in Christendom."

Nearly everything that James did displeased some part of the English people. He aroused their jealousy by a vain attempt to bring about a closer union of his two kingdoms of England and Scotland. He alienated both the Puritans and the Catholics, each of whom had expected concessions from him (see Puritans). Some of the Catholics engaged in the Gunpowder Plot to blow up Parliament and the king and bring in a Catholic ruler (see Fawkes, Guy). Only one of his acts pleased the Puritans, namely the new translation of the Bible which forms the "King James Version" now in common use.

James I also quarreled with Parliament over taxation and political matters. He believed in the "divine right of kings," that is, that they receive their powers from God, and are responsible to Him alone, and not to their subjects. He took the position that Parliament owed all its powers and privileges to the graciousness of the king; while Parliament claimed that these were the "birthright and inheritance of the subjects of England." He quarreled with it, too, over foreign affairs. He wished to ally with the Catholic country of Spain and to marry his son Charles to a Spanish princess. Parliament wanted

to fight Spain at sea, and thus aid the German Protestants in the Thirty Years' War (*see* Thirty Years' War). Not until James' plans for a Spanish alliance failed and he decided to make war upon that country, did he and his Parliament agree. The year after the war was begun James I died, leaving his son Charles I the difficult problems that he himself had been unable to solve.

The Narrow and Stubborn James II

JAMES II, who reigned from 1685 to 1688, was a grandson of James I. His ideas of the "divine right of kings" were the same as those of his grandfather and his father, Charles I. Fortified by the example of Louis XIV in France, he attempted obstinately to carry out his ideas in spite of the fact that his father, Charles I, had been beheaded by Parliament. It has been said of James II that he alienated "not only the classes which had fought *against* his father, but also those that had fought *for* his father."

When James II came to the throne the people welcomed him, and fought for him against a rebellion led by the Duke of Monmouth. But the cruelty shown to the followers of Monmouth at their trial—called the "Bloody Assizes" because of their vindictiveness—turned many against the king.

Then James angered the nation by trying to restore Catholicism as the religion of England. When he came to the throne he had promised to maintain the church "as by law established." The people took this to mean the Established Church of England (Episcopal), and rejoiced that they had "the word of a king, and of a king who was no worse than his word." But they soon learned that James put a different meaning on his word, for he did not consider the Reformation statutes to be valid. He set aside or "dispensed" with the laws against Catholics and Dissenters. Seven bishops protested against reading one of his dispensing proclamations, and James sent them to trial. He appointed many Catholics to office and even named some as bishops in the Church of England. If some of his acts indicated a toleration that was in advance of his age they were merely to aid his fellow Catholics.

How a Baby Brought on a Revolution

At first there was no organized opposition. Waiting seemed wiser, for James was 52 years old when he came to the throne, and his only children Mary and Anne, by his first wife, were both Protestants. But in 1688 a son was born to him by his second wife, who would be the heir to the throne and would be educated as a Catholic and so would prove another Catholic king. Protestant nobles unjustly claimed that the child was not really the son of James and the queen, but was fraudulently smuggled into the palace. They therefore invited James' daughter Mary and her husband, William of Orange, to come from Holland and take the throne of England. When William landed practically everyone, even his daughter Anne, deserted James, and he fled to the continent. This was the "glorious revolution of 1688."

James fled to France, where he was cordially received by Louis XIV, who had been furnishing him money to carry on his fight for absolute power and Catholicism. The French king now gave James a pension and support in trying to recover his throne. But James was defeated in Ireland at the Battle of the Boyne (July 1, 1690) and the French fleet was crushed at La Hogue in 1692. After that James gave up actively trying to regain the throne and spent the remainder of his life quietly in France, where he died in 1701. (*See also* Pretender; William, Kings of England.)

JAMESTOWN, VA. In May 1607, Jamestown, the first permanent English colony in America, was founded by a little group of men and boys sent out by the London Company. They had chosen for their settlement a marshy peninsula (an island at high tide) 30 miles up a river which they called the James, in honor of King James I. There they built a fort and a few huts of logs. Some merely dug caves to sleep in.

The site was low and unhealthy, and many soon died from disease. A supply ship bringing additional colonists a few months later found that only 38 of the original 105 had survived. Attacks by Indians, famine, and troubles over the system of holding property in common added to their difficulties. But for the efforts of burly, bragging, though efficient Capt. John Smith, the colony would have failed. The winter of 1609, following Smith's return to England, was known as the "starving time"; and when Lord de la Warre, the new governor, arrived with supplies in 1610, the colonists were on the point of returning to England.

Two important events occurred in 1619. The first representative legislative body in America was formed and the first ship bringing prospective wives for the colonists arrived.

The town was three times burned—in 1608, in 1676 during Bacon's Rebellion, and again some 20 years later. But the settlers struggled on, and for 92 years Jamestown was the capital of the colony of Virginia. Then it was abandoned and the capital was moved to Williamsburg. Buildings crumbled away, leaving only the foundation and the tower of the brick church.

Jamestown is now part of the Colonial National Historical Park, which includes most of the island, parts of the city of Williamsburg, the Yorktown battlefield, and a parkway connecting the three areas. Much old glass, pottery, and metal work has been uncovered by recent excavations. (*See* Smith, Captain John; Virginia.)

JANUARY. More than 150 years before the Christian era, January was the first month of the year in the Roman calendar. It was named from Janus, the "two-faced" god who in the Roman mythology presided over the beginning of things, and was the doorkeeper ("janitor") of heaven. The so-called temple of Janus, which was simply a gateway in the Roman Forum, was open in war and closed in peace.

During the Middle Ages the year began at various dates in different times and places. In England it was not until 1751 that January was restored to its place as first month. (*See* Calendar.)

The LAND of the "RISING SUN"



Mountains and sea—this is Japan, beautiful island empire of the Pacific. Typical of the rugged coast line is this wooded bay at Misumi, on the eastern shore of Kyushu, southernmost of the four main islands. Between them ply native sailing craft.

JAPAN. A century ago the people of Europe and America knew little about Japan. For 250 years the Japanese had shut themselves up on their islands and forbidden trade with other nations. They threatened death to foreigners who might come to their shores and to their own people who might go to other lands. They lived much as the people of Europe had lived in the Middle Ages, for they had no machines and were still ruled by feudal lords.

One July day in 1853 Commodore Matthew C. Perry appeared off the coast with a squadron of United States warships. He had come to demand that the Japanese open their ports to the ships and trade of the United States.

The steam-driven "black ships" impressed the Japanese. They knew they would be powerless against a modern battle fleet. Perhaps, said some leaders, the Western civilization of which they had

Extent.—Length of island chain, north to south, about 2,900 miles. Area of empire, 260,000 square miles—Japan proper (Honshu, Hokkaido, Kyushu, Shikoku, and adjacent small islands; Kurile, Ryukyu, and Bonin groups), 127,000 square miles; Korea, Formosa, Japanese Sakhalin, and Pescadores, 113,000 square miles; Kwantung, leased territory on Liaotung Peninsula of Manchuria, 1,300 square miles. South Sea Mandated Territories (the Marianas, Marshall, Palau, and Caroline islands). Population of empire, about 100,000,000; of Japan proper, about 73,000,000.

Physical Features.—About 4,000 islands, largely of volcanic formation, with numerous high mountain ranges and more than 200 volcanic peaks, about 50 of which are active. Korea, generally hilly, with several mountain groups. Highest point in empire, Mt. Morrison, on Formosa (12,959 feet); on the main island, Fujiyama, the "sacred" mountain (nearly 12,500 feet). Climate humid, varying from tropical in the south to harshly cold in the north.

Products.—Rice and other cereals, raw silk, tobacco, tea; sugar; iron; coal, copper, petroleum, silk, cotton, and woollen goods; chemicals, steel, paper, matches, toys, earthenware, lacquer ware, matting, etc.

Principal Cities.—Tokyo (capital, nearly 7,000,000); Osaka (over 3,000,000); Nagoya, Kyoto (over 1,000,000); Kobe, Yokohama (nearly 1,000,000).

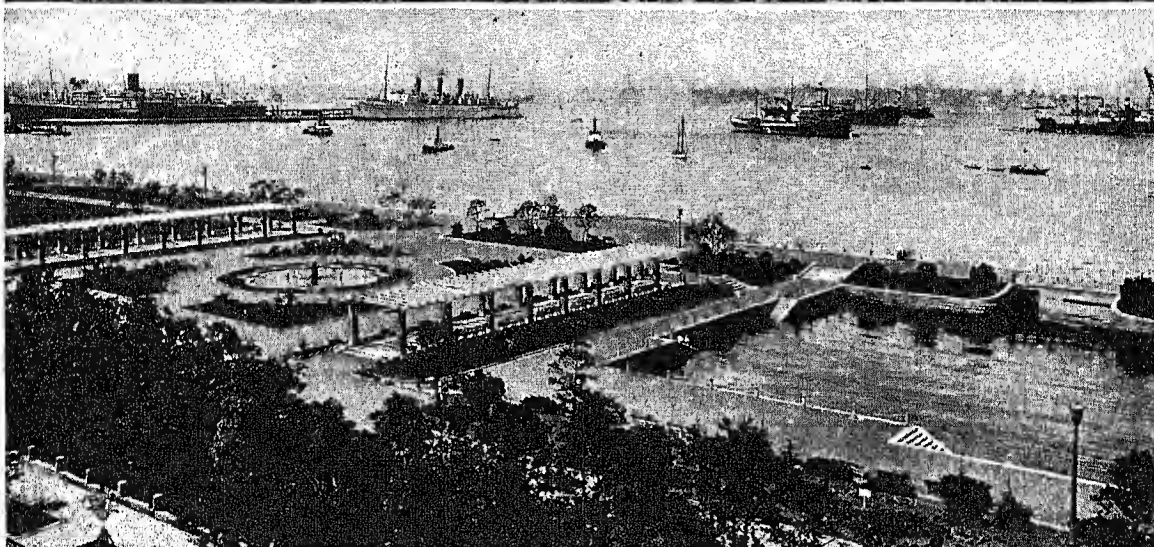
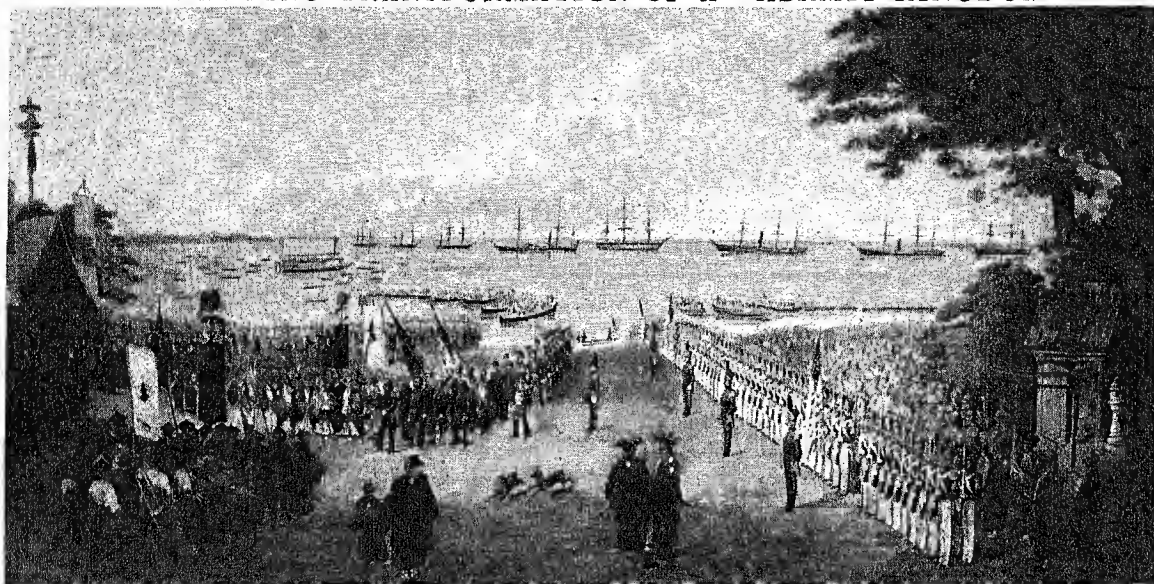
begun to hear was superior to that of the East. If so, they must admit the foreigner and learn from him. They decided in 1854 to open their doors and signed a treaty with Perry to that effect. Four years later, through the efforts of Townsend Harris, first American consul general to Japan, they signed a full commercial treaty.

Then an amazing change came over Japan. To the

astonishment of the Western nations, within 75 years the Japanese became a world power. They reorganized their laws and government along modern lines. They developed large industries run by power-driven machinery. They became one of the world's most important trading nations.

Finally they built up a great army and a powerful navy, enlarged their empire by taking territory from their Chinese, Korean, and Russian neighbors, and set out to make themselves masters of all eastern Asia and of the western half of the Pacific Ocean.

THE AMAZING TRANSFORMATION OF A "HERMIT KINGDOM"



The old print at the top shows how a momentous era in world history began. Japanese high officials are meeting Commodore Perry near the site of modern Yokohama on March 8, 1854. The Japanese, still wrapped in feudal customs, marveled at the well-armed United States marines and the big ships in the bay. Perry's visit ended in a treaty which opened Japan to world trade. With incredible speed, Japan took on Western ways. Symbolic of this great change is the modern harbor of Yokohama shown below.

An Empire Made Up of 4,000 Islands

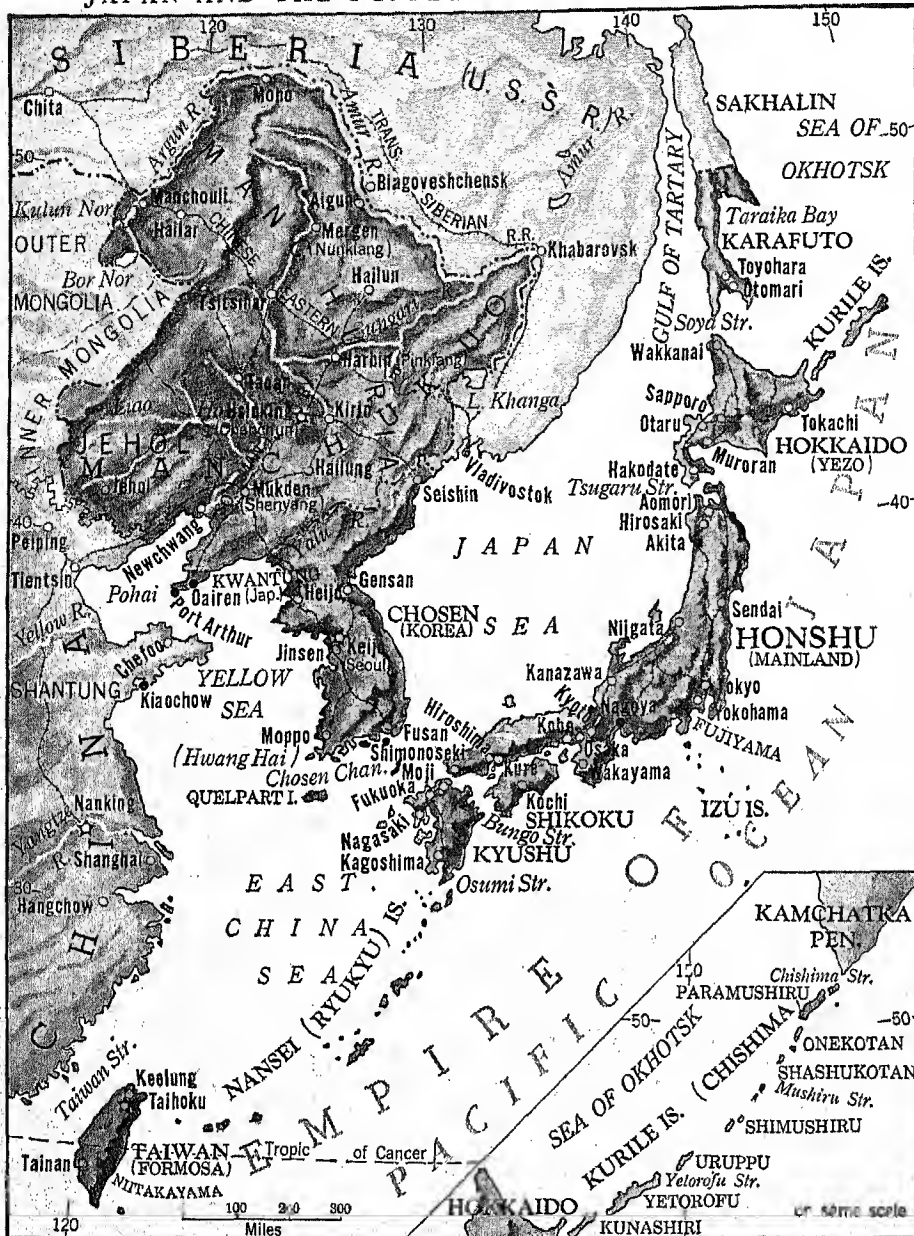
To understand this amazing country of Nippon, as the Japanese call it, we must first look at the land. On a map the Japanese islands are like a string of beads curving along the continent of Asia for about 2,900 miles. If they were placed on the Atlantic coast of North America, they would extend from northern Labrador to Cuba. All told, there are more than 4,000 of these islands, but most of them are mere specks and only about 600 are inhabited.

The heart of Japan consists of one large island and three smaller islands. These have more than half of the total area of the Japanese Empire and seven-

tenths of the people. The principal island is Honshu (also called Mainland or Hondo), which is about as large as Great Britain. Separated from it by narrow straits are Hokkaido (Yezo) to the north and Shikoku and Kyushu to the south. The island-studded Inland Sea between southern Honshu, Shikoku, and Kyushu is one of the world's most beautiful waterways. Trailing off from the four largest islands are two chains of small islands—the Kuriles (Chishima) in the north and the Ryukyus (also called Liukiu and Nansei) in the south. About 500 miles south is the isolated little Bonin group.

These and the many other small adjacent islands together make up Japan proper. Their total area is

JAPAN AND THE PUPPET STATE OF MANCHUKUO



Here is the heart of the Japanese Empire. In the center are the four main islands. From these, an awakened Japan began a march of expansion, which soon took in Taiwan, Karafuto, Chosen, and created the puppet state of Manchukuo. The map suggests the motive for this. Note how the mountains restrict farm land, yet offer water power. Hence Japan developed manufacturing and sought elsewhere for raw materials.

only about 147,000 square miles—less than the area of California. But on them are crowded 73 million people, more than half as many as live in all the United States.

The Japanese Empire also includes a number of colonies. Chief of these are half of the island of Sakhalin (Karafuto), which was taken from Russia in 1905; the island of Formosa (Taiwan), taken from China in 1895; and Korea (Chosen), on the mainland of Asia,

the East China Sea, has many bays and inlets.

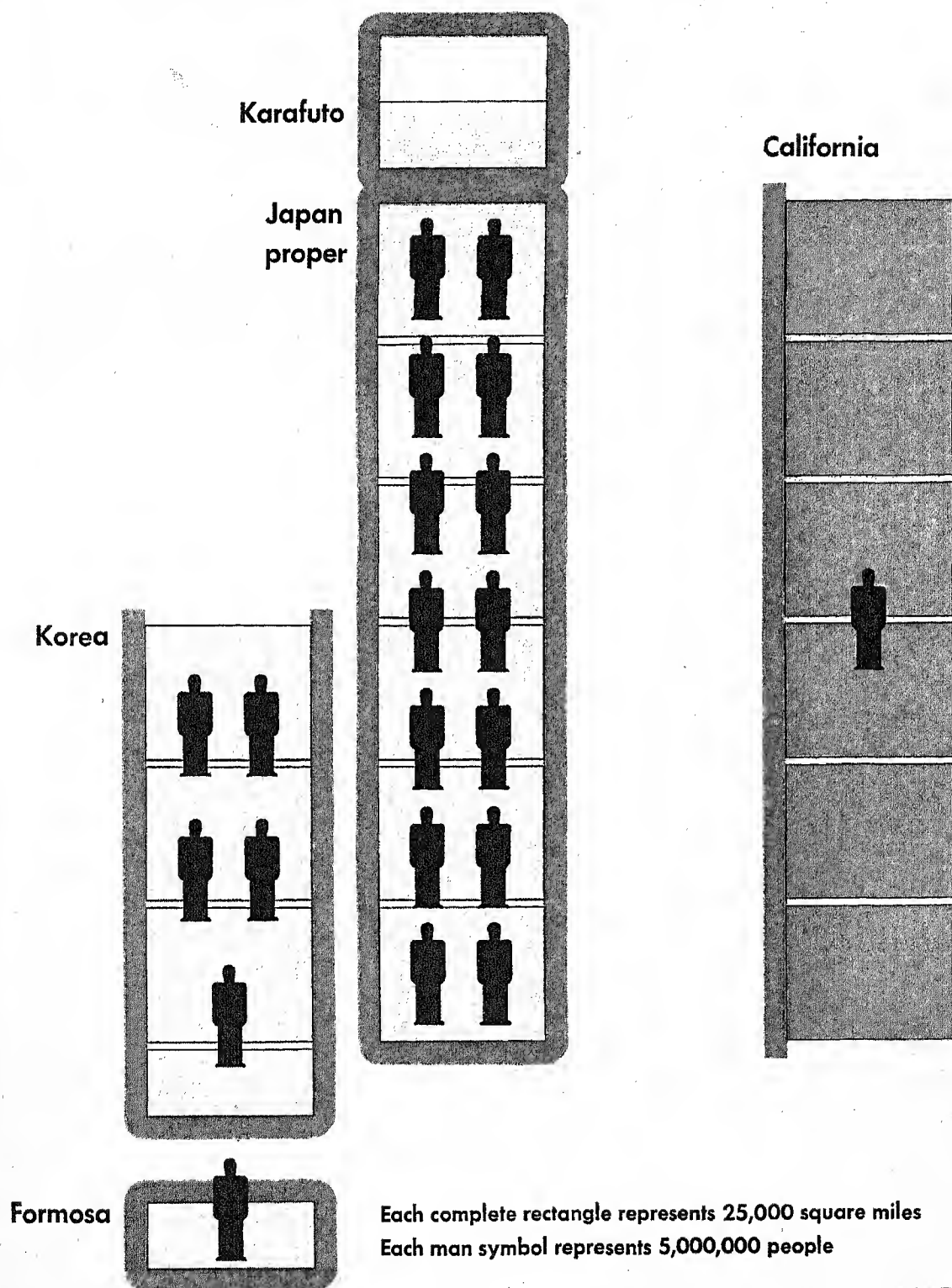
A Land of Mountains, Streams, and Lakes

Japan is one of the most beautiful countries in the world, with its green wooded mountains, lovely little lakes, and rushing streams and waterfalls. More than two-thirds of all the land is mountainous, for the Japanese islands are just the tops of a great submerged mountain chain. The highest peaks, except Fujiyama, the loveliest and highest, range from

annexed in 1910. Far out in the Pacific it also has the hundreds of small islands of Micronesia—the Marianas, the Carolines, and the Marshalls. These were put under Japanese mandate after the first World War and became enormously important as air and submarine bases. Their total area is little more than 800 square miles, but they control a million square miles of ocean. With its colonies and mandates the empire (Dai Nippon) covers about 260,000 square miles. On this territory, a little smaller than Texas, are huddled about 100,000,000 people. (See Formosa; Korea.)

The long coast line (13,000 miles) of the four principal islands is much indented on the Pacific side, and many large bays offer good harbors. On the west, where the coasts of Hokkaido and Honshu are washed by the Sea of Japan, there are fewer natural harbors. But the west coast of the island of Kyushu, facing China across

Japan and California Compared

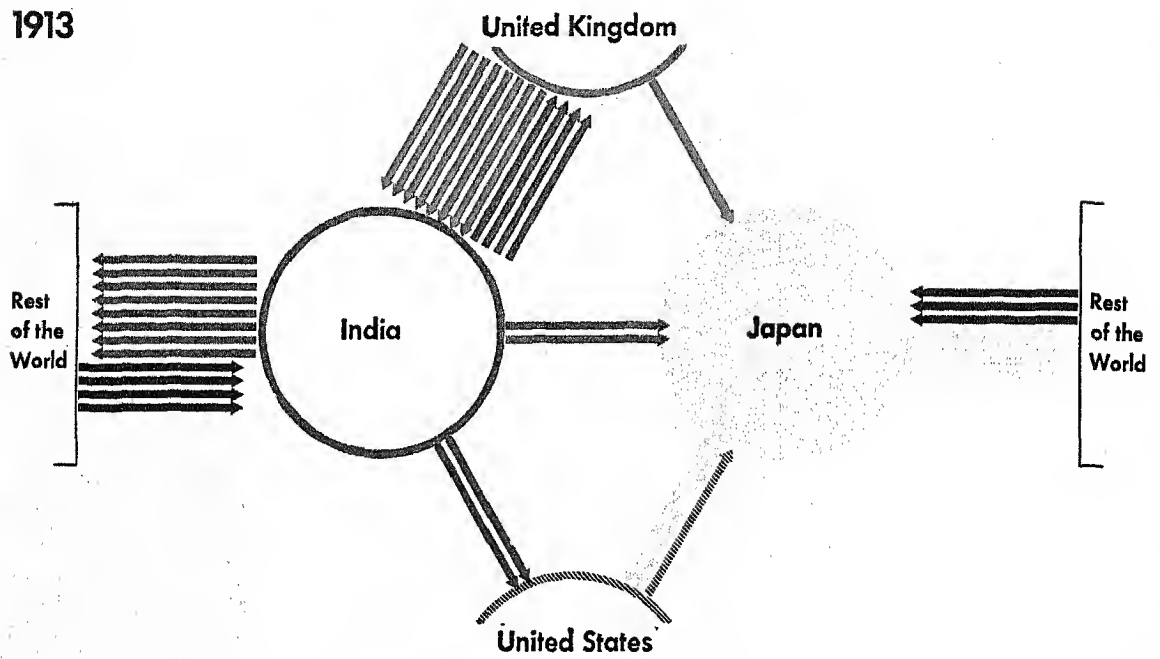


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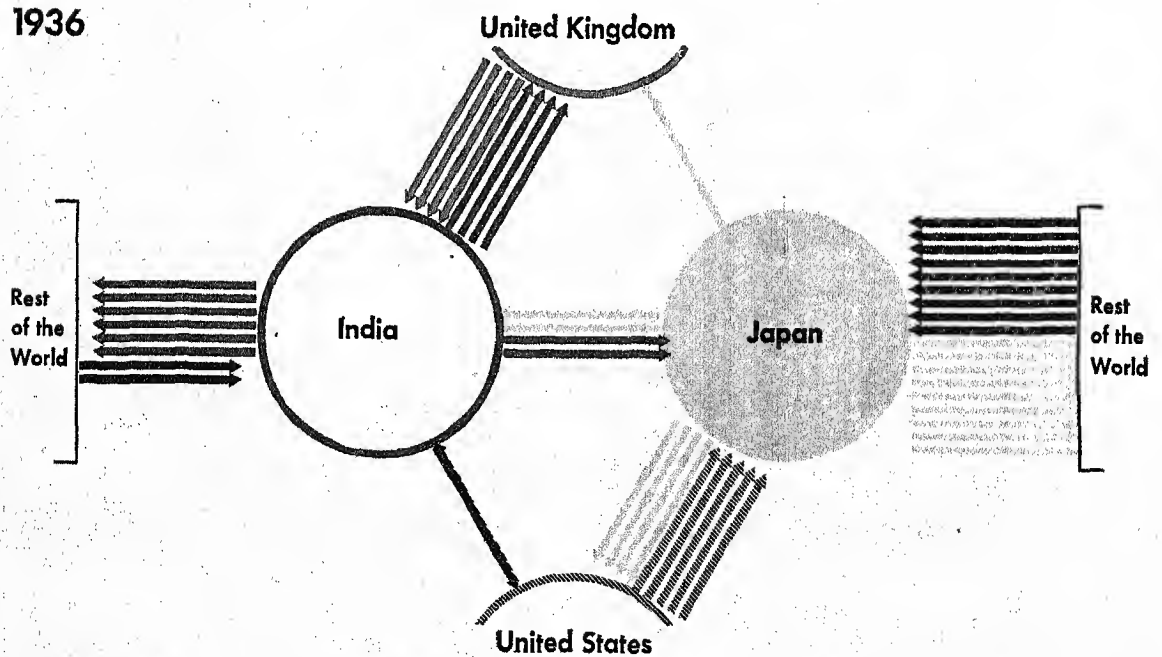
Growth of Japan's Commercial Power

Japan's and India's Foreign Trade Compared

1913



1936



Each line represents trade worth \$ 50,000,000

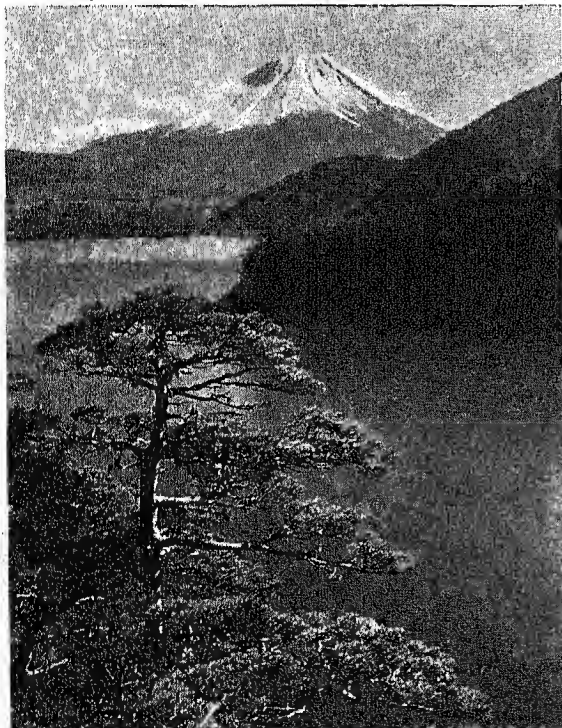
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WHY JAPAN HAS SO LITTLE FARM LAND

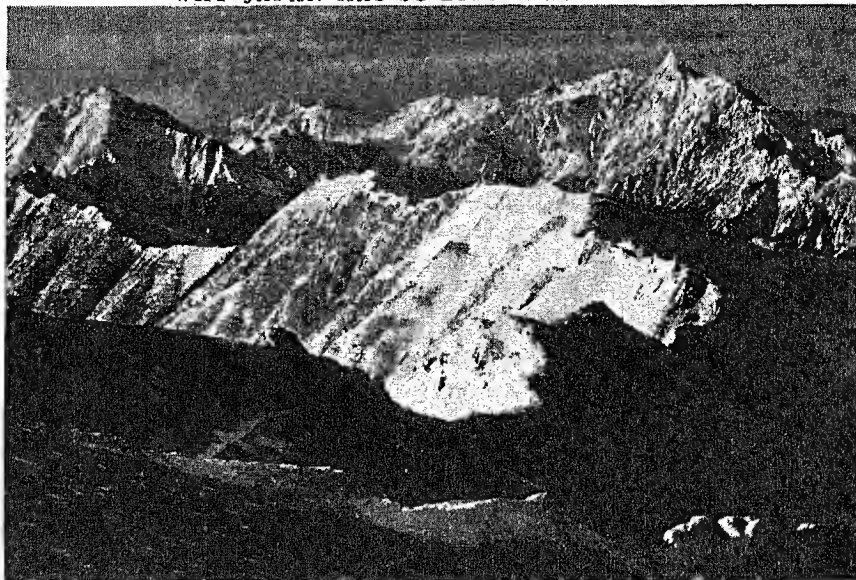
6,000 to 10,000 feet. Most of the mountains are thickly wooded except where they have been terraced for farming. In autumn the foliage, especially of the maples and oaks, takes on brilliant colors. In spring the whole land is gay with wild flowers and flowering fruit trees. Evergreens grow on the mountain slopes of the northern islands. One of the common evergreens is the tall cryptomeria, or Japanese cedar, a pine peculiar to Japan. Farther south are large forests of bamboo.

The mountains have many small lakes and are cut by many deep river valleys. The short, shallow streams dash down as swift torrents in the rainy seasons and in spring when the snow is melting. They provide plenty of water for irrigating rice fields. The many waterfalls and rapids are

JAPAN'S MOST FAMOUS PEAK



Majestic Fujiyama (or Fuji-san), 70 miles southwest of Tokyo, rises nearly 12,500 feet. It is held sacred by the Japanese, and until 1868 women were forbidden to climb its shrine-dotted slopes. A snow-capped volcano, it last erupted in 1707.



Many people think of Japan as a land of rice fields and orchards. But over two-thirds of it is mountainous. In central Honshu, the Japanese Alps, shown here, rise over 10,000 feet. Mountain climbing is a favorite Japanese sport.

useful for water power, but they prevent navigation except by small flat-bottomed craft.

Near the sea the valleys broaden out into coastal plains that are as a rule small and narrow. Most of the people live on these plains, farming tiny plots of land or are crowded into the cities.

Volcanoes, Earthquakes, and Floods

Beautiful as the mountains are, they are also a heavy handicap. They make the greater part of the islands unfit for cultivation, and more than 50 of them are active volcanoes which sometimes take a heavy toll of life. Moreover, they are part of the "earthquake belt," and they are shaken by about a thousand earthquakes a year—an average of nearly three a day. Most of the shocks are slight, but some cause terrible damage and loss of life. (See Earthquake.) Floods too are frequent, caused by the swollen mountain streams and by the tidal waves which so frequently accompany earthquakes.

Japan's Varied Climates

The empire's great length from south to north gives it a wide variety of climate—from tropical in Formosa to cold and bleak in the northern islands. The mountains also contribute to the variety of climate, making it colder at higher elevations. Northern Honshu and Hokkaido have a climate somewhat like that of the New England states though the precipitation is much less, averaging less than 20 inches a year. Southern Honshu, Shikoku, and Kyushu have a humid and semitropical climate, much like that of the cotton belt of the United States. This warm moist climate is excellent for rice, the main food crop, and in the uplands for tea, the favorite drink. It is also good for spinning cotton and growing silk. In general, the climate in this part of Japan is warm

enough so that people can live in flimsy houses and wear cotton clothing the year round. Only for two months, January and February, is it really cold. (See Storms; Winds.)

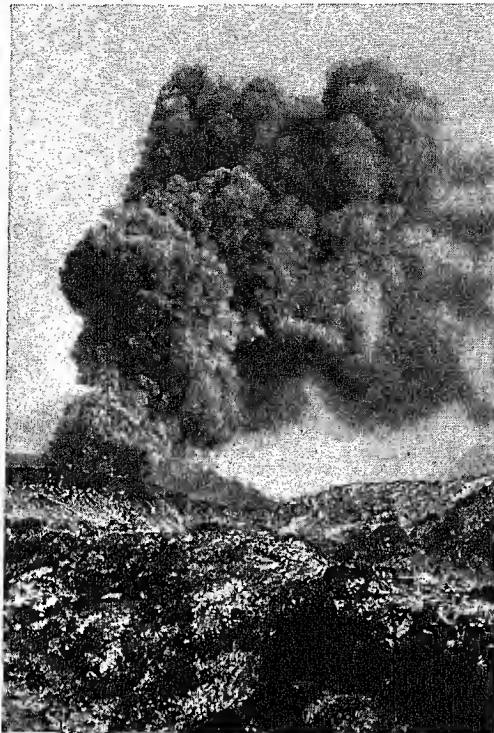
Monsoons and Ocean Currents

The climate is influenced chiefly by the winds called *monsoons* and by ocean currents. Cyclonic storms called *typhoons* occur at all seasons, but particularly in late summer and autumn, bringing heavy rains. They often do great damage.

In summer the warm monsoons, laden with moisture, blow in from the southeast, bringing warmth and many rainy days. For weeks at a time the skies remain overcast and rain falls every day. The parts of Japan where the large cities are get from 60 to 80 inches of precipitation a year. The winter monsoons from the cold interior of Asia bring many cloudy days and a heavy blanket of snow to western Japan, while eastern Japan enjoys sunny days and comparatively mild temperatures, rarely as low as 20° F. In some western districts the snow is so deep that the railroads are tied up for several days nearly every winter.

But even western Japan is warmer in winter than corresponding regions in China, partly because of a warm ocean current which hugs the west coast. This is the western branch of the Kuro Shio or Kuro Siwo (Black Current). It flows north from tropical waters, passing between the Korean peninsula and the southern islands of Japan. Semitropical plants, such as tea, will grow farther north on the west coast than on the east, because the west coast is not affected by the cold Okhotsk Current. A branch of this current flows down from the north close to the east coast.

MANY VOLCANOES AND WATERFALLS



Minerals, Forests, and Fisheries

JAPAN's greatest resources are the abundant fish off the coasts, the useful trees in the forests, and the wealth of water power for manufacturing. In the value of its fisheries it is first among the nations, and in hydroelectric power it is surpassed by only two or three. Four-fifths of Japan's electric power is generated by water.

But in minerals, Japan is the poorest of the world powers. Only coal is abundant, but little of it is suitable for making coke for the iron and steel industry. There is some iron ore, but the total amount that could be readily mined is not enough to supply the United States steel industry for a year. There are thick veins of copper, but the metal is of poor quality and cannot compete with the American and African product. Gold and silver are produced in small amounts. There is plenty of sulphur for the chemical industries and kaolin and other clay for the pottery

manufactures. Japan proper has little petroleum and has to import 90 per cent or more of its supply, in addition to the small amount it makes from coal. Other important minerals are almost entirely lacking and have to be imported.

More than half of the four main islands are forested. The consumption of wood is heavy, and so the government enforces a policy of conservation and reforestation. Half or more of the timber cut each year is used as lumber for dwellings, since nearly all Japanese houses are built of wood. The remainder is used for making paper or for charcoal, which is the general fuel for heating and cooking. But much of the lumber for build-



One of Japan's fifty or more active volcanoes is shown at the top. This one is the famous Aso-san near the city of Kumamoto on Kyushu island. Below is Kegon Fall, the outlet of Lake Chuzenji in the Nikko region north of Tokyo. The fall is about 330 feet high.

NOTHING HERE WILL BE WASTED



With characteristic thoroughness, Japanese glean the most from their resources. Approved land is lumbered, the logs are floated cheaply to market (upper left), and the bark is used for roofs. Bamboo (upper right) is put to dozens of uses, ranging from hats to houses. Coastal waters provide abundant fish. Those shown here in the dragnet are yellowtail, related to the mackerel.]



Many kinds of fish are taken. Some of the most important are herring, salmon, mackerel, bream, sole, sardines, cod, bonito, tunny, squid and cuttlefish, eels, carp, smelts and swordfish. Whaling, crab fishing, and shrimping are other profitable branches of this industry. A substantial proportion of the fisheries products is normally exported.

Farming in a Crowded Land

For its area, Japan proper is one of the most crowded of the great nations. Only Belgium, the Netherlands, and Great Britain, among European countries, are more densely populated. Since 1870 the population has more than doubled. For a time it was increasing at the rate of nearly a million a year,

and it is still growing fast, though not so fast as a few years ago. This crowded population has to be supported on a very small acreage of farm land. Three-quarters of the land is tilted at an angle too steep for farming. And even though many of the mountains have been terraced high up their steep slopes to make fields, the total used for farms in Japan proper is only 16 per cent of its area.

Every acre of crop land must provide food for about four people. Compare this with the United States, where there are three acres of crop land for every person, to say nothing of the grazing land. Even Belgium, the Netherlands, and Great Britain have more arable land per person. Yet, because the Japa-

ing has to be imported, and most of the pulpwood used in rayon manufacture.

Bamboo from groves planted in the warmer regions is used for the framework of houses, for junk sails, screens, paper, mats, and for many other purposes. Camphor and varnish trees are sources of profitable industries (*see* Camphor; Lacquer and Shellac).

Fish are the meat of the people, for Japan raises few live stock. The Japanese fisheries are the most productive in the world, and nearly a million Japanese fishermen range the Pacific from Siberia and China to the Americas. Another million of farmers and small tradesmen get part of their living by fishing during the height of the season.

nese people are so frugal and the farmers so industrious, Japan can grow nearly all the food it needs. The principal food items it has to import are soy beans, rice, and sugar, mostly from its colonies. Sugar is a great luxury and many of the poorer people never taste it.

Nearly half of the working population are farmers. They do everything by hand, because they cannot use machines on their tiny farms. Two-thirds of all the farmers have less than $2\frac{1}{2}$ acres apiece, whereas the average United States farmer has more than

150 acres. So they work long hours to make every acre produce as much food as possible. They grow rice wherever they can, because rice yields more food to the acre than any other crop. Japanese farmers get a larger yield than any other people. They use a great deal of fertilizer, cultivate the fields with hoes and irrigate them by water paddles which they work with their feet (*see Rice*).

Two-thirds of the cultivated area is used for rice, but vegetables, wheat, barley, and rye are also grown as second and third crops on the paddies after the rice has been harvested. On much of the other land two crops are grown at the same time. Vegetables and grain crops are planted between rows of mulberry trees, or vegetables are grown in alternate rows with millet, buckwheat, or corn. The principal vegetables are soy beans and other kinds of beans, radishes, cabbages, white potatoes, sweet potatoes, onions, and carrots.

Tea is an important crop in the south and southeast. It is grown in small patches on hillsides and terraced slopes. Tea is the national beverage and plays a significant part in the life of the people (*see Tea*). Tobacco is another considerable crop.

WEIGHING THE DAY'S TEA PICK



Picking tea is a family task. With kimono sleeves tied back, workers pluck the leaves and toss them into bamboo baskets on their backs.

and it chokes out any good grazing grass that is sown. Second, with so small a farming area, all the good land must be used for food crops for human beings. Third, the Buddhist religion forbids the eating of beef. The government is trying, however, to encourage dairy and stock farming on cold Hokkaido.

Poverty of the Farmers

The farmer's rent and taxes are high, fertilizers are expensive, and the price of his crops is low. Rent alone takes 50 or 60 per cent of a tenant farmer's crops.

More and more of the farmers are losing their farms and becoming tenants. Nearly 30 per cent of them own no land, and 40 per cent more of them own only part of the land they till. Land is falling into the hands of a small group of owners; 50 per cent of it is owned by only 8 per cent of the landowners.

Most of the farm families help out their meager income by working in their homes at various household industries, or taking jobs in small factories in slack seasons, or fishing. Chief among the home industries until recent years was silkworm culture and silk production. Japan supplied more than two-thirds of the world's raw silk (*see Silk*).

TYPICAL JAPANESE FARMER



In a grass cloak to keep out rain or hot sun, he works hard and asks little. He is using a heavy homemade mattock.

Each farmer usually has several small scattered fields, instead of a single farm. And instead of living in widely separated farmhouses, all the farmers of a neighborhood live in one village.

Simple Ways of the Village

The village is a closely organized community and the people cooperate in many activities. The Japanese do not mind crowding, for they are sociable people. The little wooden houses with their paper windows are built so close together that their thatched roofs may touch. (For a description of the houses and their furnishings, see Japanese Art and Architecture.)

Fish and rice are the principal foods, both in the villages and in the cities. But many of the farmers are so poor that they cannot afford to eat the rice they grow. They sell their rice and live on barley or millet, which are cheaper. Soy beans are also important in Japan's diet. The favorite vegetables are pickled radishes (*daikon*), white carrots, salted cabbage, sweet potatoes, and white potatoes. Chickens and eggs are eaten by those who can afford them. Tea appears at every meal, and on festive occasions there may be a jug of *sake* or rice wine. This diet, nutrition experts point out, is deficient in usable proteins, in minerals, and in vitamins. The lack of vitamins is aggravated by the fact that the Japanese prefer polished rice, thus losing the vitamin content of rice hulls.

Country people everywhere wear the gay-colored, graceful kimono. Many city people, too, especially women, still cling to this characteristic costume, with its great *obi* or sash tied in a butterfly bow at the back. Farm women tie back the flowing sleeves and tuck up the skirts when they work in the fields. Men usually wear short kimonos and close-fitting trousers. Instead of shoes, the country people and most of the city people too wear straw sandals or wooden clogs (*geta*). The heavy-soled cotton socks (*tabi*) have a separate place for the big toe to make room for the sandal strap. In the fields they usually work barefooted.



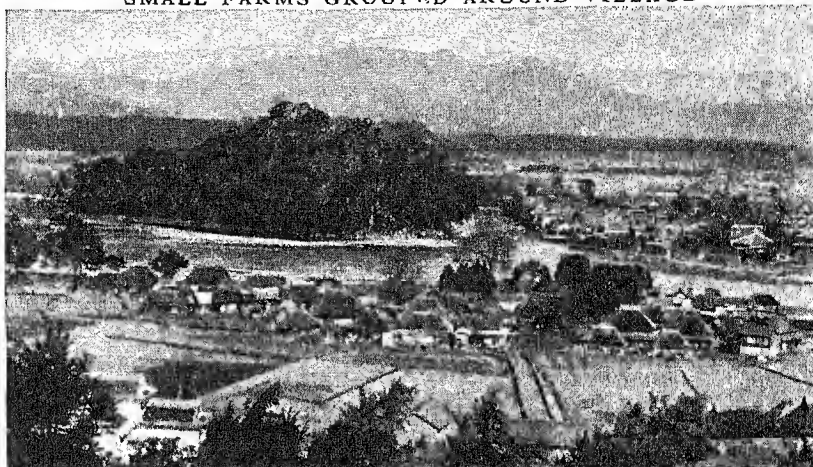
Wooden clogs or geta

Housekeeping is simple, and so farm women can spend most of their time working in the fields. In the morning the bedding is quickly rolled up and put away. When breakfast has been eaten, the bowls and chopsticks are rinsed and left to dry. Then the farmer's wife is ready to go to the field with

her husband. She may work all day with a baby strapped to her back, while the smallest children play on a mat spread on the ground and the older children work by her side.

Thanks to the plentiful water power, electric current is cheap. About 90 per cent of all the houses, even in the villages, have electric lights. But radios average only about two to a village, and only one family in ten in the country districts subscribes to a newspaper or other periodical.

SMALL FARMS GROUPED AROUND VILLAGE



The farm village is the backbone of Japan. Ditched rice paddies and vegetable patches make every inch of ground grow food. Note the absence of barns for live stock.

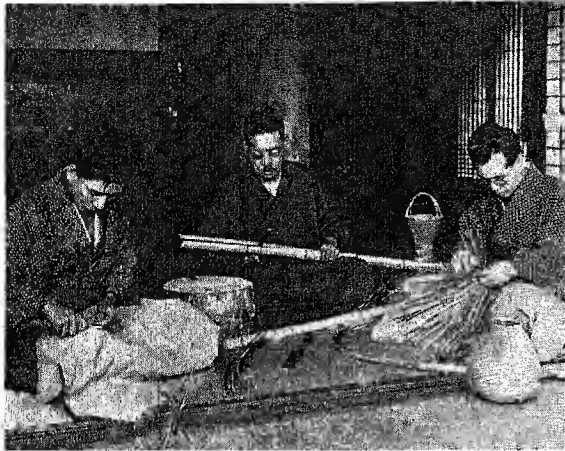
City Life, Industries, and Trade

BY THE SIDE of this rural Japan, still rooted fast in its ancient ways of life, there is another Japan—the Japan of great sprawling cities and modern machines. This is the new Japan that has grown up since Commodore Perry's visit. The capital Tokyo is nearly as large as New York City, and there are five other cities with populations ranging from just under a million to more than 3 million. (See Tokyo, and articles on other chief cities.)

The business sections of these cities are as modern as Chicago or Pittsburgh. They have tall buildings of steel and concrete. Their broad streets are crowded with streetcars, motorbuses, automobiles, and bicycles. But they are an odd mixture of the new and the old. One can turn off an avenue lined with modern shops and department stores and movies into a narrow lane where artisan dealers make their wares in sight of the customer. Jinrikshas drawn by men roll along beside taxis.

Nearly all the men in the cities wear foreign-style business clothes, but nearly all the women still wear kimonos and click-clack along the streets on wooden clogs. Most of the men who work in modern office buildings go home to old-fashioned houses in the suburbs. There they change their European business suits for kimonos, and live as their forefathers did, sitting on the floor to eat with chopsticks from low tables and sleeping on wooden pillows.

MANY SMALL INDUSTRIES ARE BASED ON SKILLFUL HAND LABOR



Japan's vast supply of cheap labor makes manufacture by hand profitable. Thousands work at home, like the men splitting bamboo for baskets (left). The family's mat beds are rolled up in the rear cupboard. At the right is a humbler workman—a cooper making wooden pails and tubs. Like most Japanese craftsmen, he uses the floor as a work bench.

About half of all the people of Japan live in cities of more than 10,000 population, and about one-fifth of the working population are employed in the factories and mills. The principal manufacturing belt and all the large cities are on the eastern coast of Honshu. This is the most densely populated region and it has the best harbors. The great industrial cities naturally grew up around the ports to which imported raw material could most conveniently be brought. But as water power is widely distributed, many small plants have been set up in small towns and villages as well. This makes it easier to get workers, for the peasants dislike to leave their homes. It also provides cheaper labor.

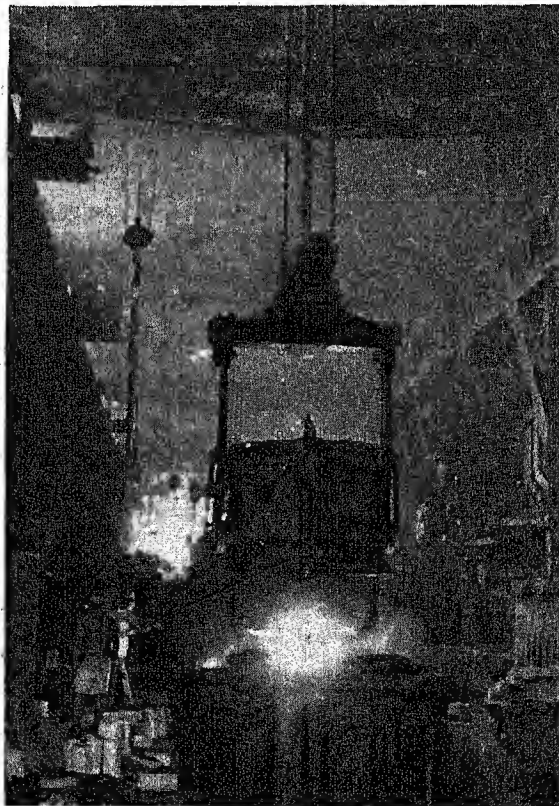
Long Hours and Low Wages

More than half of all the industrial workers are in small workshops or household industries. No labor laws regulate wages or hours of labor in these small establishments, where fathers, mothers, and children toil for unbelievably long hours and small pay. Cotton spinning, rayon manufactures, flour milling, shipbuilding, and the heavy industries such as metal refining

and the manufacture of machinery, airplanes, and chemicals are about the only industries commonly carried on in large plants.

Wages of factory workers are very low, only about one-tenth of the average in the United States in

BUT THIS TOO IS JAPANESE INDUSTRY



This big iron foundry is typical of Japan's modern equipment for manufacturing machinery, ships, and munitions of war. Most of the raw materials used in Japanese heavy industry are imported. Iron and steel manufacture is closely controlled by the state. Many workers live in "company towns."

money value and about a fourth or a fifth in purchasing power. Women and girls make up a large proportion of the employees, and they are paid only about half as much as the men. Working people in Japan can get along on low wages because the standard of living is low. They do not expect the comforts and luxuries that the workers of Western industrial countries do. They live just as frugally as their ancestors did in feudal days. They work long hours too, twelve or more in the day as a rule, and they usually have only two rest days in the month. No day of the week is set aside, like the Christian Sunday, for rest or religious observances.

Low labor costs are one principal reason why Japanese manufacturers can make goods more cheaply than their competitors, and can undersell them even in their home market. For example, Japan flooded

the Far East with \$4.50 bicycles. That is one reason why other nations put high tariffs and other restrictions on Japanese goods.

The Chief Manufactures

Textiles, especially cotton spinning and weaving, accounted for more than 30 per cent of the total value of Japan's industrial output during the 1930's. Nearly all the raw cotton has to be imported from other countries but Japan is so favored by its low labor costs and other advantages that it not only clothes all its people but produces an enormous amount of cotton goods for export, chiefly to other Asiatic countries.

Second to cotton in the textile group of manufactures is rayon, made mostly from imported wood pulp. In the 1930's Japan became the greatest rayon-manufacturing country in the world. Silk, which was long the leading export, began to fall off during the same period. At one time 40 per cent of the farm families raised silkworms and 10 per cent of the crop land was given over to mulberry trees to feed the worms. Four-fifths of the output was exported, because the Japanese could not afford to wear their own silk. The United States took 80 or 90 per cent. But the demand fell off because of the world depression and the competition of other fibers, and in 1941 exports ceased entirely when the United States ended trade relations with Japan.

Girls do nearly all the work in the textile factories. They work long hours and get very low wages. In large factories they are housed in dormitories under strict discipline. Most of them are farm girls who work for a few years to save enough money for

GIRL WORKERS IN A MUNITIONS PLANT



These young women are examining cartridge shells for flaws. For very small pay they work 12 hours a day, with only two days off each month.

THE FAMOUS NIPPON BRIDGE IN TOKYO



For centuries all distances in Japan were measured from this point. The original wooden bridge was replaced in 1911 by granite spans. The street which crosses the bridge is popularly called *Odori* (Broadway), and is lined with big stores and offices.

a dowry. Under the stimulus of government preparation for war, the heavy industries were enormously expanded after 1935. By 1941 they had far outstripped textiles in value and made up about half of the nation's total production.

The second group of manufactures is the metal industries, especially iron and steel and machinery. The leading center for the heavy industries is Osaka, which is near the principal coal beds.

Chief among the other products are normally chemicals, cement, rubber goods, porcelain and earthenware, glassware, enameled ironware, preserved goods (especially canned fish), woodware, hosiery, bicycles, toys, leather goods, electric light bulbs, and a host of articles of the kind sold in ten-cent stores.

Most of Japan's trade is carried on in its own ships. Its best customers in normal times were the United States, British India, the Netherlands Indies, Manchukuo, and China. Japan also began reaching out for new markets in Central and South America, Africa, Asia Minor, and southwest Asia. Besides the materials already mentioned Japan imports chiefly petroleum, tobacco, rubber, coal, machinery, timber, wool, fertilizers, wood-pulp, lead, foodstuffs (beans, wheat, rice, corn, sugar, meat), oilcake, copper and other metals, and automobiles.

"Big Business" in Japan

A few gigantic companies control the lion's share of Japanese industries, shipping, and banks. Most of these are family groups organized into holding companies of enormous scope. The house of Mitsui, for instance, owns or controls mines, lumber companies, iron works, flour mills, chemical works, cotton mills, paper and rayon

mills, oil refineries, tea plantations, engineering and machinery works, power plants, railroads, newspapers, department stores, insurance companies, banks, and steamship companies. The holdings of other great family interests are similarly diversified. There are about 15 of these big houses, chief of which are Mitsui, Mitsubishi, Sumitomo, Yasuda, and Okura. These five, it is said, control two-thirds of the nation's total wealth. Other powerful business groups grew up in the 1930's, mainly in the new engineering and chemical industries. In no other modern nation do so few control so large a proportion of the total wealth and business.

MUCH FREIGHT STILL MOVES BY MAN POWER



With horses and work cattle very scarce and motor trucks too expensive, local freight traffic is largely handled by coolies drawing their own carts. This one has trained a team of dogs to help him.

Transportation and Communication

In OLD JAPAN baggage was carried by men or pack horses. Heavy goods traveled from port to port by boat. High officials rode in elaborate carriages drawn by oxen or in curtained palanquins, carried by servants. Those of lesser rank rode on horses or in an open palanquin (*kago*) slung from a pole. The masses of the people walked. Later the jinriksha, or rickshaw, replaced these clumsy vehicles, and today the rickshaws with their swift runners are giving way to taxicabs and streetcars. Bicycles are everywhere. They are cheap, and are more generally used than in any other countries except perhaps the Netherlands and Denmark. Automobiles throng the streets of large cities, but motor travel is hampered by the lack of suitable roads.

The railroads are narrow-gauge, single-track lines, with an average speed for passenger trains of 18 miles an hour. The first railroad, 18 miles long, began service between Tokyo and Yokohama in 1872. It was financed by a British loan, built by British engineers, and used imported equipment. Today there is more than 15,000 miles of trackage, much of it electrified. Since 1906 the government has been gradually taking over the privately owned roads.

The rivers of Japan are short and so often broken by rapids and falls that inland water transportation

is limited to local traffic in flat-bottomed boats. But the river mouths and bays and the numerous channels among the coastal islands teem with small motor craft and sailing vessels that carry on a considerable part of the internal trade.

The dominating factor in Japan's economic life is ocean commerce. In 1853 Japan revoked a law two centuries old, which prohibited the construction of ocean-going vessels. It began to buy ships and later to build them. In 1893 the first regular steamship route, to Bombay via Manila, was established. Thirty years later the flag of the Rising Sun flew in every port of the world, and Japan had become the third nation in the tonnage of its merchant marine. Shippers and ship builders were helped by generous subsidies from the government.

Air services, frequent and regular, connect all chief cities and span the seas to the Japanese-controlled areas on the mainland of Asia and the far-flung island colonies in the Pacific.

Development of Communication

Modern methods of communication also developed rapidly. There is efficient postal service, and government-owned telegraph and telephone systems. Telephones, in use in every business building, have found their way into only a small percentage of homes. Radio broadcasting began in 1925. A network of stations, under

a monopoly authorized by the government, offers a variety of programs for education and entertainment.

Japanese city dwellers are avid newspaper readers. They support more than 6,000 papers, most of them devoted to reporting romantic and sensational local news and to publishing popular novels in serial form. Editors are allowed astonishing liberties in discussing and criticizing the lives of private citizens. But any news about the imperial family or about political and military affairs is subject to strict censorship. The better class of papers in the large cities devote a great deal of space to foreign news gathered throughout the world by representatives of two great Japanese news agencies.

The People—Family and Social Life

THE PHYSICAL characteristics of the Japanese are believed to represent a mixture of Chinese or Korean elements with East Indian stock. Most of the people are short. The average height of the men is only 5 feet 3½ inches and of the women 4 feet 10½ inches. But they are sturdy and energetic. Except for their smaller stature, they look much like the Chinese, with straight black hair, round faces, and high cheek bones. They are used to poverty and hard work, and are for the most part thrifty, uncomplaining, and ambitious to learn.

A PROSPEROUS JAPANESE HOME



Here is the heart of Japan—the family group. The Western tablecloth shows that it is a modern city family. Notice the electric cord on the floor (right). Nearly all homes have electricity.

Social life centers on the family. The worship of ancestors, the almost fanatical devotion of parents to their children, the filial piety expected of children, all serve to knit close the family ties. Young Japanese are trained to consider the welfare of the family before their own personal desires. Boys are held to be superior to girls, and in family life are given every preference. When boys and girls walk together, the boy goes ahead and the girl follows.

Boys are encouraged to participate in sports. By tradition, as well as by current national policy, the soldier is held up as an ideal, and all boys are required to serve a term in the army.

Girls Lead Humble Lives

Girls are taught to be obedient, pleasing under all circumstances, faithful, thrifty, and self-effacing. They are trained in household duties and ceremonies. After they finish the six years of education required by the state, girls of the middle and poorer classes usually go to work. They labor on farms and are often placed in factories by their fathers who in many instances collect their small wages. Here they live in dormitories under the most extreme supervision and work for very long hours. The death rate among these girl factory workers is very high.

In recent years so many young men have been kept in military service that young women have taken their places in all types of employment. They work in factories, offices, and department stores, run elevators, operate telephone switchboards, and serve as teachers and nurses. The higher professional and executive positions are, however, held by men. While the increase in the employment of women has made them less secluded than in former times, there is little difference in their real status. They are not allowed to vote or to enter political organizations and have far less independence than Chinese women.

The Japanese never lose sight of the fact that the chief duty of women is to marry and bear children. Marriages are usually arranged by the family, and the girl has little to say about the choice of a husband.

The man is always the head of the family. A woman obeys her parents until her marriage; then she obeys her husband and his parents. If her husband dies, she obeys her sons. As a general custom, all the wife's earnings and any property she owns before her marriage or inherits later belong to the husband. Nevertheless the Japanese wife has a great deal to say about the management of the household. It is a Japanese tradition that money should be held in contempt, so the husband usually turns over his wages to his wife. She purchases the food and clothing for her family, pays the rent, and plans for other essential household expenses.

Sports, Old and New

The Japanese have always been great lovers of sports. They are famous wrestlers and fencers, and national tournaments in these sports have been held for centuries. The two forms of wrestling are *sumo*, in which the heavier and stronger man usually wins, and *judo* (jiu-jitsu), which requires skill rather than physical strength. Judo, usually thought of as the typical Japanese form of wrestling, was introduced originally from China but was greatly improved by the Japanese (see Wrestling). Archery, another ancient sport, has been revived and is included in the curricula of some schools, especially for girls.

The Japanese are today almost as enthusiastic over baseball as are Americans. They have both professional and school teams. Tennis, football, and skiing are other sports which they have adopted. They are proficient in track and field sports and swimming, and have made notable records in the Olympic Games.

Some Popular Forms of Entertainment

One of the favorite amusements of the wealthier Japanese in the cities is a banquet in a restaurant or teahouse, with entertainment by singing and dancing girls, called *geisha*. The training of these girls begins when they are very young. In special schools they are taught music, singing, dancing, manners, and grace. Many of them marry into prominent families. In recent years, however, with the increased emphasis on discipline and the military spirit, the popularity of the *geisha* has declined.

Theaters, motion-picture houses, and the public baths all attract crowds in search of amusement. And particularly do the people enjoy a trip to a place of great beauty or of historic interest, or a pilgrimage to a famous shrine.

Religion, Education, and Government

RELIGION is very complex. The national religion is Shinto (the Way of the Gods). It combines nature worship and ancestor worship. In a sense it is really a worship of Japan itself. All Japanese are believed to be descendants of the Sun Goddess, Amaterasu, and to belong to one great family headed by the emperor whom the people regard as divine. While Amaterasu is the chief deity of

Shinto, there are also lesser gods of the mountains, streams, and forests. Shinto shrines are usually simple white buildings. They contain no images but in the veiled interior of any shrine dedicated to the Sun Goddess, there is a mirror, a sword, or a jewel. These are symbolic of the goddess. The paths leading to them are crossed by one or more *torii* or gateways. Every home has its miniature shrine where homage is paid to ancestors and native gods.

Shinto has been the dominant religion since the Restoration in 1867. In recent years it has become identified with patriotism and has attained great political significance. Through Shinto the Japanese have been taught from childhood to believe in their divine origin and in their right to dominate other peoples.

Confusing to many is the Japanese belief that a person can observe the Shinto rites and accept another religion at the same time. Thus millions of adherents to Buddhism, the official religion of Japan before the Restoration, worship at Shinto shrines, as do many who profess to be Christians.

The Schools and What They Teach

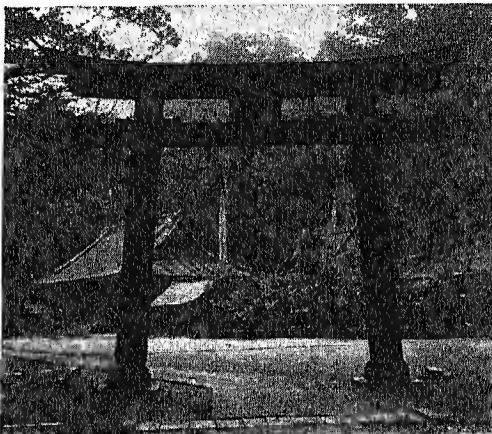
Education in modern Japan is founded on the Imperial Rescript of the Emperor Mutsuhito (Meiji), issued in 1890. This decree which is really the Bible of Japanese nationalism is read to the children so often that they know it "by heart" even before they can understand it. It says in part:

Ye, Our subjects, be filial to your parents, affectionate to your brothers and sisters; as husbands and wives be harmonious, as friends true; bear yourselves in modesty and moderation; extend your benevolence to all; pursue learning and cultivate arts, and thereby develop intellectual faculties and perfect moral powers; furthermore, advance public good and promote common interests; always respect the Constitution and observe the laws; should emergency arise, offer yourselves courageously to the State; and thus guard and maintain the prosperity of Our Imperial Throne coeval with heaven and earth. So shall ye not only be Our good and faithful subjects, but render illustrious the best traditions of your forefathers.

From the United States Japan learned to insist that all young children must go to school, and more than 99 per cent of them do—a higher rate than is found among Americans. There are more school days in the year and longer school hours than in our American system.

Six years of primary (elementary) school for every boy and girl are required by law. But after the primary school training, competitive examinations greatly limit the number that can go on with their formal education.

GATEWAY TO A SHINTO SHRINE



This framework, shaped like the Greek letter π , is called a *torii*. Many of these are seen throughout Japan and mark the approach to a temple or shrine.

Secondary schools for boys include middle schools, which give a five-year course in such subjects as ethics, literature, languages, and history, and vocational schools, which give technical, agricultural, and business courses. Boys who aspire to university go from middle school to higher school. Secondary schools for girls are similar to boys' middle schools. While there are so-called women's universities, they

are not comparable in entrance requirements or courses with those established for men.

Older Japanese students take their work so seriously that many suicides occur because of failure in examinations. Four-fifths of all teachers are men. They are trained in normal schools which are so military in character that the graduates need serve only one year in the army instead of two. Great stress is laid on teaching "morals," by which is meant the principles of duty toward the emperor and the state and respect for authority.

Courses in the universities correspond in general to those in Western institutions. The development of personality and the "cultivation of national thought" are among their stated aims, and special efforts are made to stamp out any tendency toward "dangerous thoughts" on the part of young radicals. A large number of young Japanese of well-to-do families are graduates of American and European universities.

Government Is a Military Dictatorship

Though Japan has in name a parliamentary system, it is in reality governed by a small oligarchy of military leaders, aristocrats, capitalists, and officeholders. The parliament (Diet) has never had much power, and such power as it had gained was reduced to almost nothing in the period from 1930 to 1940.

Though everything is done in the emperor's name, he is only a figurehead. Real power is exercised by high officers of the army and navy, with the more or less willing support of the other dominant groups. The mass of the people never truly emerged from the old attitude of feudal submission to their government, and there is little tendency to rebel against the military dictatorship.

Language and Literature

THE FORMAL Japanese written language is the outgrowth of characters introduced from China as early as the third century. But its use today is largely limited to official documents. Newspapers, books, and other popular material are written in the "spoken language." This is an adaptation of the Chinese picture words (ideographs) to the sounds and

forms of Japanese speech. Chinese ideographs are nearly always used for the chief words. But Japanese characters are used with them to show pronunciation or to add new meanings. In order to read, Japanese must learn about 100 characters of their own and at least 3,000 Chinese ideographs, the number to which newspapers try to limit themselves. Well-educated men and women learn two or three times as many.

The Japanese language has virtually no conjunctions, adverbs, articles, or relative pronouns, and nouns have neither gender nor number. To show gender, a prefix is used, *o* (male), *me* (female). Terms used in business, politics, and science are largely taken from foreign languages, especially English and Chinese.

The Japanese have no "l," and when this sound appears in foreign words most of them pronounce it like "r," in contrast to the Chinese who tend to pronounce "r" like "l." This fact has been used in war zones to detect Japanese disguised as Chinese.

Poetry, Prose, and Drama

The Japanese have produced no great literature. But many of their writings have grace and charm. They also tell us much about the people and their customs, and make us feel the spirit of Japan. From its beginnings in the 8th century, Japanese literature has been widely influenced by Chinese culture. Indeed

the famous characteristic form of Japanese poetry, the *tanka*, was adopted in the 8th century from China. Still popular today, the *tanka* is an unrhymed poem of 31 syllables, arranged in five lines of 5, 7, 5, 7, 7 syllables respectively. A shorter form, called the *hokku*, omits the last two lines of the *tanka*. Nearly every Japanese can compose verses in these traditional forms.

Japanese prose is extensive but largely undistinguished. Notable exceptions are some writings of the classic period (9th to 12th centuries), chiefly by women. Early in the 11th century, Lady Murasaki Shikibu wrote 'The Tale of Genji', which some authorities have called "the world's oldest novel." This long romance richly describes court life. In modern times, Japan's intense effort to learn Western ideas brought a flood of translations of European classics.

Among the most widely admired of Japanese art forms are the dignified *No* (Noh) plays. First performed at the imperial court in the 15th century, they are based on historical and legendary tales, accompanied by music and dancing. The principal actors wear wooden masks and elaborate costumes. Women's rôles were formerly taken by men impersonators, but modern plays now employ actresses. (See also Japanese Art and Architecture.)

How a Hermit Kingdom Became a World Power

THE JAPANESE came apparently from an intermingling of peoples who migrated at different times, principally from the mainland of Asia. Settling on the island of Honshu, they gradually extended their territory by fighting back inch by inch a strong but much more primitive race which they found there. Descendants of these aborigines still live on the northern islands. They are called Ainus and are remarkable for their hairiness.

The early history of Japan is so mixed up with legend that we cannot be certain what is truth and what is story. Japanese children even today are taught that the emperor's family is descended from the gods, and the reigning emperor, Hirohito, is considered to be the 124th of the line, which began with Jimmu Tenno in 660 B.C. The Japanese call the emperor *tenno* ("heavenly king") or *tenshi* ("son of heaven"). The word *mikado*, commonly used by foreigners, is the old classical or poetical term.

In the 6th century A.D. Buddhism reached Japan, bringing with it the brilliant culture of the Chinese. Missionaries, merchants, artisans, and scholars from China and Korea flocked to the islands, and Buddhist monasteries became schools of learning and industrial arts. The Japanese, however, were never blind imitators. They quickly adapted to their own needs the things they borrowed from other peoples.

The Shogunate and Feudalism

As the court grew more and more luxurious and the nobles became absorbed in the arts, a military class was appearing and growing powerful in the outlying

provinces. Soon the emperor became a puppet in the hands of the fighting lords, called *daimios*, who gathered about them knights or soldiers, known as *samurai*. In 1192, after a series of civil wars, one of the lords, Yoritomo, emerged supreme. He appointed military officials in all the provinces, and took the title *sei-i-tai-shogun*, or "great barbarian-subduing general."

Thus arose the office of shogun, which until past the middle of the 19th century was to be much more important in the affairs of the nation than that of emperor. The emperor at Kyoto, although theoretically the source of all power, reigned but did not govern.

Most of the land, meanwhile, had come to be held by the powerful military lords in great tax-exempt estates, and a system of feudalism much like that of medieval Europe was developing. The *daimios* and *samurai* became separated by a wide gulf from the commercial and agricultural classes. They conducted themselves according to a code called *bushido* (way of the *bushi*, or warrior), which resembled the chivalry of feudal Europe.

In the centuries following the establishment of the shogunate there was almost constant civil war, as strong military leaders fought for mastery. But in the 13th century the rival factions united and held off the Mongol armada of Kublai Khan until a sudden storm destroyed it.

How Japan Became a Hermit Nation

The first Europeans reached Japan in the 16th century, bringing two things that were to influence it profoundly—firearms and Christianity. Europe had

long before heard of the rich islands from Marco Polo, who had traveled widely in China (see Polo, Marco); and *Cipango*, as he called the country, was one of the objects of Columbus' search. But the first Europeans to see Japan were Portuguese sailors whose ship was wrecked on the coast in 1542. The great missionary

Francis Xavier began his labors there in 1549. The Dutch, the English, and the Spanish, through Mexico, were soon trading with the empire, and for a time both trade and Christianity were encouraged.

Early in the 17th century, Japan began to shut her doors against Europe. Relentlessly Christianity was stamped out. All Japanese were forbidden to leave the country on pain of death. Trade with Europeans was cut off, except for the Dutch, who were grudgingly permitted to call at one port. The chief reason for this change of front probably was the growing fear that Christianity might pave the way for invasion.

During the two centuries of hermit life which followed, the nation became more prosperous and a sense of national unity appeared. Moreover, with peace and luxury, the warrior class was declining. The shoguns were no longer the vigorous rulers they had been. When Commodore Perry arrived in 1853 the country was ripe for change.

Beginnings of the New Japan

The event that started Japan on the path of modernizing itself was the visit of Commodore Perry. His mission was to persuade the Japanese to stop maltreating sailors from United States whaling vessels who were shipwrecked on their shores, and also to obtain a treaty allowing ships in the China trade to stop at Japanese ports for provisioning. The treaty signed in 1854 opened two trade ports to the United States, and within a few years these and other ports were opened to other Western countries. These treaties gave Western nations extraterritorial rights; and they permitted customs duties to be fixed by treaty, which meant that Japan surrendered the right to fix her own tariff. Both conditions made the Japanese feel that they were being treated as an inferior people and they were removed after a struggle of some 40 years.

Japan's transformation was well started in the reign of one great ruler, Mutsuhito (1867-1912), or Meiji

(meaning "enlightened government"), as he was called after death from his reign name. Coming to the imperial throne 13 years after Perry's treaty was signed, he overthrew the shogun the following year (1868). Feudalism was declared abolished. Peasants might now own land and the new army became a national

army, recruited from every class. But some elements of feudalism lingered on.

Much of the land soon fell into the hands of large owners, and the farm workers, forced to pay high rents, exorbitant taxes, or to work for a wage, became poorer. Industry, trade, and finance came to be almost monopolized by a few extremely wealthy private concerns, or "big families"—the Mitsui, the Iwasaki (Mitsubishi), the Sumitomo and others. And the industrial workers were exploited to such a degree that their condition was little better than serfdom.

In his famous Charter Oath, Meiji urged his subjects to seek knowledge and wisdom in all parts of the world so that they might help to place the empire on a firm foundation. Embassies of Japanese statesmen and students set forth to visit the great nations of

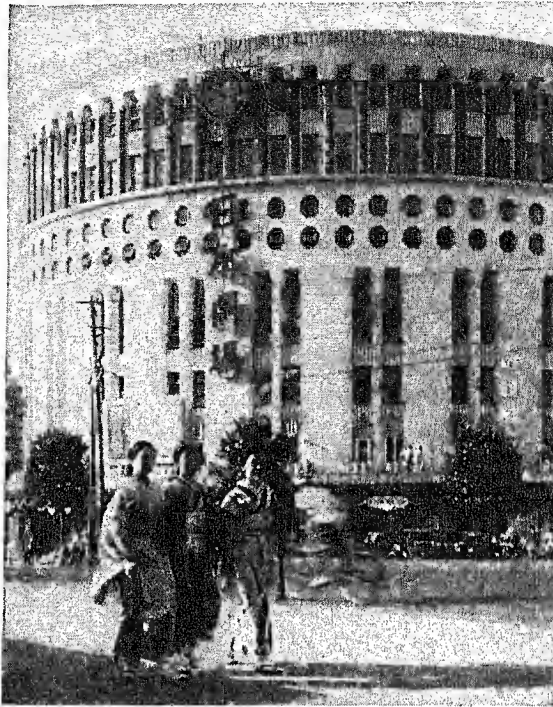
the West. They were garbed in the dress of old Japan, in kimonos with plaited overskirts of heavy silk, and they wore their hair in queues knotted on top of their heads. In appearance they were men of the old Japan, but their minds were alert for new ideas.

The Government Is Reorganized

Those who studied political systems were influenced by the German idea of government, and so drafted a constitution (proclaimed in 1889) on that pattern rather than according to the Anglo-Saxon idea of democracy. It provided for a cabinet, headed by a prime minister, a privy council, and a diet consisting of a house of peers and a house of representatives. From a group of samurai who led in the reorganization of the government was formed another body, the *Genro*, or Elder Statesmen, which was unofficial but long had great influence on national affairs.

The German army and navy likewise seemed suitable models. France and Italy contributed conceptions of art and architecture, the United States and England their ideas of education and industry. The United States supplied also modern methods of agriculture.

ON THE GINZA, TOKYO'S "MAIN STREET"



The old and the new meet in picturesque confusion on the Ginza, Tokyo's chief business street. It is lined with vast motion-picture houses, like the one you see here, with department stores and with office buildings. Notice the women in the old native costume, and the modern automobiles parked in the background.

FEUDAL CASTLE AND MODERN GOVERNMENT BUILDING IN OSAKA



Osaka is a city of contrasts—shrines and smokestacks, temple gardens and modern playgrounds. The oldest memorial of the past is the castle, built in 1585 by the shogun Hideyoshi. A corner of the castle wall appears at the left above. In the struggle between the Emperor Mutsuhito and the Tokugawa shoguns, in 1868, part of the castle was burned. It has been rebuilt, and is now used as a divisional army headquarters. Facing it across the canal is the modern prefectural office building.

If Japan's development in half a century or so from a feudal society to a modern nation with a centralized government is remarkable, even more astonishing is her rapid rise to a place among the world's great powers. Several reasons explain the aggressive policy she has pursued in expanding her territories and strengthening her position in the Pacific.

Some of Japan's Reasons for Expansion

First is the problem of a fast-growing population in a land of small farming area. One solution would be emigration. "But," say the Japanese, "all the regions of the earth to which the Japanese might migrate in large numbers are closed to them by immigration barriers" (see *Immigration*). The neighboring areas to which they might migrate, such as Manchuria or Mongolia, do not attract them because these regions have a colder climate and a lower standard of living than Japan. To furnish a livelihood for her people, therefore, Japan began to develop light industries producing chiefly for export. Then her chief problems became those of obtaining raw materials and markets. Manchuria, Mongolia, and north China, if they were properly developed, could supply the materials she lacked. And in China there lay a vast market for her products, if she could control China's trade. Herein lies the economic reason for Japan's imperialistic policy.

A second reason is strategic. Japan's geographic position makes it imperative that no strong nation which might be hostile shall establish itself on the neighboring seaboard of Asia. Moreover, the Japanese saw how the Western nations were carving out colonies and spheres of interest for themselves from the lands of weak peoples. Reason enough, they considered, to build up their strength! Soon some of Japan's leaders began to see the possibility of making their nation the mistress of eastern Asia. Many others, no doubt,

would like to see their nation give up conquest, but the militarist group has been strong enough to overrule the conservative element.

Japan Grows Strong and Builds an Empire

Japan's first move to strengthen her position was in the dangerously close peninsula of Korea, a vassal state of China. In a successful war against China in 1894-95, which demonstrated the strength of her new army and navy, she forced China to recognize Korea as independent, and to cede to Japan the island of Formosa (Taiwan) and the Pescadores Islands. She also obtained the Liaotung Peninsula of southern Manchuria, another strategic spot. But Russia, Germany, and France, alarmed at Japan's growing strength, forced Japan to give the peninsula back. Then, within two years, these three nations demanded and obtained grants or leases of Chinese territory for themselves.

It was now clear that Russia not only was Japan's chief rival in China, but was a menace to Japan's national security. It was obtaining a foothold in Manchuria and threatening to absorb Korea. Thus Russian power might soon be solidly established on the part of the Asiatic mainland which is separated from Japan by only the narrow barrier of the Yellow Sea. The inevitable war, in 1904-05, resulted in a decisive victory for Japan. This victory not only enlarged the Japanese empire, but brought it recognition as one of the world's great powers. Russia was forced to give up to Japan her rights in Manchuria, including the leased territory of Kwantung at the tip of the Liaotung Peninsula, and half of the island of Sakhalin. She was also forced to recognize Japan's superior interest in Korea. (See *Russo-Japanese War*.) Five years later Japan annexed Korea outright.

Expansion in the First World War

The first World War gave Japan a new opportunity to strengthen her position. In 1914, in fulfillment of

a treaty of alliance with Great Britain, she seized the German possessions and special interests in the Far East. The Treaty of Versailles gave her a mandate over the former German islands in the north Pacific and left Kiaochow and all the German concessions in the province of Shantung in her hands. The rights in Shantung, however, she renounced in 1922 under pressure from the European powers.

At that time she signed the Washington, or Nine-Power Treaty, agreeing to maintain the "open door" in China and guaranteeing China's territorial integrity. Earlier, in 1915, Japan had taken advantage of the war to hand her neighbor the famous "Twenty-one Demands," which, if accepted, meant giving Japan economic and political control over China. But the Chinese and the United States governments protested so vigorously that the most drastic of the demands were withdrawn. Nevertheless, even as accepted, they greatly extended Japan's influence.

The Army Invades Manchuria

Thus ended the first period of Japan's territorial expansion. For the next ten years, she bided her time and built up her military and economic strength. Then, in 1931, she began a series of aggressive moves which finally developed into a war for mastery of the whole Pacific area.

In that year the Japanese militarists, long impatient with their liberal government's "weakness" toward China, sent an army to occupy Manchuria. In 1932, Japan set up a government there (see *Manchukuo*). Protests from China and the Western powers and admonitions from the League of Nations were of no avail.

Japan's "Monroe Doctrine"

Japan resigned from the League, and in 1934 announced that in the future she would be "the guardian of the peace of the Pacific," a policy which has been called the "Japanese Monroe Doctrine." The same year *Manchukuo* bought, with Japanese money, Russia's interest in the Chinese Eastern Railway, the last commercial interest of the Soviet Union in Manchuria. After the puppet state was established, the Japanese, aided by *Manchukuo* troops, continued their penetration on the continent, with the object of setting up "autonomous" states in north China and Inner Mongolia.

Anti-Japanese feeling ran high in China and found expression in boycotts, acts of violence against Japanese citizens and property, and minor flare-ups between Chinese and Japanese troops in north China.

Attempts to settle the difficulties between the two nations by diplomatic negotiation in the autumn of 1936 failed. China's stiffening resistance led Japan to fear that China, through a secret agreement, counted on help from Soviet Russia in case of war.

So Japan hastily concluded a pact with Germany whereby the two nations agreed to cooperate in combating the Communist International. The agreement lined Japan up with the Fascist powers and thus increased the hostility of the great democratic nations. Meanwhile Japan in her continued penetration in the north had an eye, not only toward separating the Chinese from contact with Soviet Russia, but also to establishing a base for attack on her old enemy.

"Undeclared War" against China

Japan began "positive action" against China in July 1937, when affairs in Europe made it unlikely that European nations would do much more than protest. Hope for a speedy victory soon vanished and Japan found herself involved in a long and costly conflict.

The democratic powers condemned her, not only for violating her treaties—notably the Kellogg-Briand Pact (see *Peace Movement*)—but also for her ruthlessness in bombing civilian communities, destroying cities, and endangering the lives and property of foreigners. In 1940 Japan placed Wang Ching-wei, a former Chinese nationalist, at the head of a "national government" in Nanking to rule the areas in northern and central China which the Japanese had occupied. The Chinese contemptuously rejected this puppet régime.

War with Other Pacific Powers

The outbreak of a second World War in 1939 was seized upon by the military-minded Japanese rulers as the time to accelerate their program of aggression. A "new order" alliance was formed with Germany and Italy, in which Japan was assigned dominance in "Greater East Asia." From France, after its defeat by Germany in 1940, Japan won far-reaching military concessions in Indo-China.

A vast new phase of Japanese imperialism began Dec. 7, 1941. That day Japan, without warning, invaded Thailand, bombed Hawaii, the Philippines, and other American outposts, and attacked British possessions in the Far East. The United States and Great Britain, as well as the Netherlands Indies, China, Australia, and other powers, then formally joined in war against Japan (see *World War, Second*; also *China*; *Pacific Ocean*; and *Japan* in *FACT-INDEX*.)

The Children of the Sunrise Kingdom

TO FOREIGNERS Japanese children seem in many ways to be serious little copies of grownups. This is because they are trained to obey their parents without question, to be extremely polite, and to hide their feelings. When they lose at games or are hurt, they rarely cry. Instead of shaking hands, they bow from the waist. To show respect to an honored guest, they suck in their lips and hiss enthusiastically. Almost from the moment they are born they live accord-

ing to rule, for no nation pays more attention to old customs and traditions.

The long years of discipline have advantages, such as teaching Japanese children to cooperate, to work hard without complaint, and to be brave. But living by rigid rules also deprives them of many of the advantages enjoyed by American children, such as learning to be self-reliant, to think for themselves, and to handle new problems successfully.

Religion is closely woven into Japanese life, and ceremonies begin in the first few days of childhood. On the seventh evening after birth, friends and relatives bring gifts for the name-giving ceremony, called "Honorable Seventh Night." Earlier that day, the father has bowed before the household shrine and has placed there a paper bearing the child's name, so that it will be known to the spirits of his ancestors. If a child is a first-born son, the name likely will be Taro.

When a boy is 32 days old, and when a girl is 33 days, the child is wrapped in a tiny kimono and carried to the shrine of the patron god of the district. There a Shinto priest records the name and birthday, and the child formally becomes a member of the community.

When he is only four months old, he is seated at a tiny table, and this first lesson in the use of chopsticks is called "First Eating." When children are three years old, and again at five and at seven, they are taken to the Shinto shrine to celebrate their "Growing Up" festivals.

Eastern and Western Ways Combined

At first sight, Japanese children look much alike. Their dark round eyes are button-bright. Their black hair is short and straight. They seem like lively dolls in their kimonos, bright and flowered for girls, darker and simpler for boys. School boys and girls wear uniforms of Western style, and sweaters and shoes. But some girls change into kimonos at home, tucking toys and paper handkerchiefs into the wide sleeves. Children are usually smaller for their age than those in the United States. They have short thick legs, which may come from sitting cramped on their heels, because Japanese homes have no chairs. But at school they sit at desks, stretch and bend in Western physical training, and many grow taller than their parents.

They like best of all to work and play in groups. From the time they are babies, strapped to the backs of mothers or elder sisters, they are used to being with people. A favorite game is *jan-kem-po*. Two players double their right fists, shake them, say "jan-kem-po" quickly three times, and at the third time they thrust out their hands, making one of three signs. The first two fingers spread out stand for scissors. The open palm means paper. If the fist stays closed, that means stone. Stone dulls scissors, scissors cut paper, paper wraps stone. And so stone

wins over scissors, scissors over paper, and paper over stone. The two players must, of course, make their signs at the same moment. Even grownups play the game, and sometimes use it to settle disputes in the same way as we might toss a coin.

Boys and girls will jump up from any game when a traveling peep show or professional story teller

comes by. They love to hear of Japan's ancient heroes and warriors, especially Momo Taro, the boy who sprang from a peach stone and overcame cruel giants with the help of a pheasant, a monkey, and a dog. Children of the many poor families have little time to play. After school they must help in the rice fields, or at home where whole families work side by side, and often

PLEASE, GRANNY, JUST ONE MORE STORY



Japanese homes do not have furnaces. On frosty days the family sits around a charcoal burner. The quilt keeps in the heat to toast legs and feet. Notice that two of the children wear Western clothes.

far into the night, to make toys and other small articles for export to all parts of the world.

Everyone Takes Part in the Festivals

In this land of few luxuries, everyone looks forward to festivals. These are the real holidays, for there is no weekly day of rest like our Sundays. There are several official holidays, when the flag of the Rising Sun waves before nearly every house. But the "Four Great Holidays" are New Year's (January 1); Kigensetsu (February 11), which is the anniversary of the accession to the throne of the Emperor Jimmu, first of the traditional emperors of Japan; Meijisetsu (November 3), the anniversary of the birth of the Emperor Meiji; and, finally, the birthday of the reigning emperor. Families go out together to join the processions. No matter how large the crowd, police are seldom needed to keep order, for young and old are well behaved.

Of all celebrations, New Year's is the favorite. It is everyone's birthday. Children are considered to be one year old when they are born. On New Year's day everyone adds a year. It is the time for forgetting the disappointments of the old year and for making a new start. People pay up their debts. Every family cleans its house from top to bottom, scouring every nook. This is usually an easy task, since most homes are kept spotless the year round. Rice cakes and sweetmeats of various shapes are served, with extra care taken to make them attractive. Japanese believe that food must be pleasant to the eye, and guests are expected to admire the porcelain and lacquer bowls in which tea and food are served. During the day, girls play the traditional battledore and

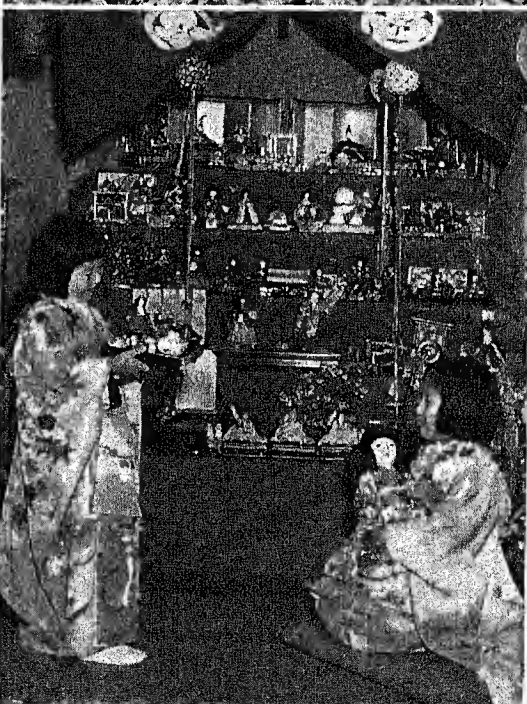
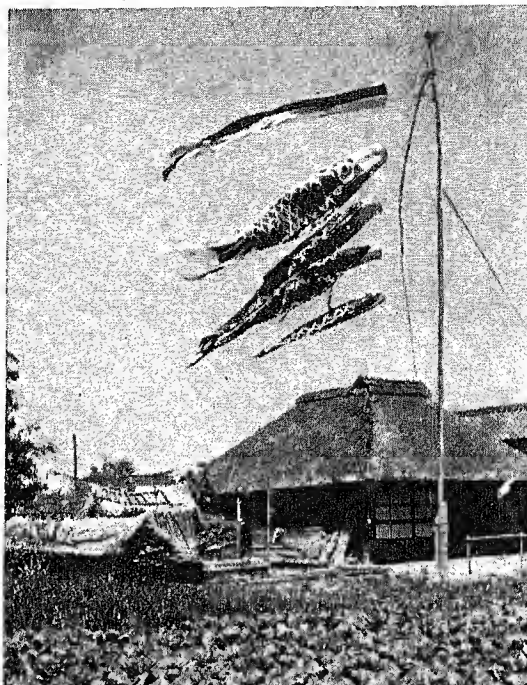
CHILDREN'S FESTIVALS

shuttlecock, and boys spin tops or fly fighting kites (see Kites). Many families write New Year's poems. Nearly everyone takes pride in composing verses in the traditional forms. Evening brings card games, especially one that "matches" a hundred classic poems, and perhaps games of *go*, an ancient and intricate pastime resembling chess. As always, the whole family takes part together.

The Dolls' Festival and the Boys' Festival

Boys and girls each have a special festival. On March 3, the colorful Dolls' Festival (sometimes called Peach Blossom Festival) reminds girls that they must always be peaceful and gentle as peach blossoms. Shelves, usually five, are placed one above another in a corner of the best room. They are covered with a red cloth, a favorite color for girls. Ceremonial dolls, handed down from one generation to another, are placed on them in traditional arrangement. On the top shelf of honor are the Prince and Princess. Below them are court ladies, musicians, guards, and footmen, all dressed in the rich court costumes of older days. Toy cherry and orange trees, one at each side, and paper peach blossoms and lanterns brighten the shelves. Trays and baskets of red and white rice cakes and sweets shaped like fruit and fish are offered, then shared by the little hostess and her friends, who visit from house to house.

On May 5 is the Boys' Festival. Every family which has sons proudly sets up a long pole in the garden or on the roof, and flies from it a paper fish (carp) for each boy. The eldest son is honored by the largest fish, which may be 15 feet or more long, and the baby is represented by a tiny fish. As the boys proudly watch the carp



All Japan celebrates its two great children's festivals. Four paper carp "swimming" in the wind on the Boys' Festival, show that the house above has four sons. Below is a typical display for the girls' day, the Dolls' Festival.

dart and twist in the air, they know that their parents want them to be strong and brave like the carp, which is said to leap over waterfalls and does not quiver when touched with a knife. Indoors, the boys and their father set up shelves, where they put figures of ancient warriors, miniature armor, and toy weapons. The day is devoted to impressing the boys with the importance of bravery and devotion to Japan.

Other Feast Days

Throughout the year there are other festivals in which everyone takes part. A spring favorite is the "Cherry Blossom Viewing" in April, when families picnic and spend the day admiring the national flower. The emperor gives a garden party then, and also in the autumn at the blooming of chrysanthemums, the flower on the imperial crest. Flowers are one of the chief delights, and girls learn traditional flower arrangement (*ikebana*), striving to make blossoms and even twigs look as if they were growing naturally. In the autumn too are "moon-viewing parties," when the family admires the silver-white beauty of Lady Moon, and listens to the thin music of "singing" crickets and to frogs bought from street merchants. Or perhaps some one plucks a *samisen*, a three-string guitar, or plays a bamboo flute.

Through the paper walls of some homes will come the sound of phonographs, which are becoming popular. But more often than not the phonographs will be playing not Western music, but the reedy and haunting songs of the *samisen* and other traditional Japanese instruments. At home, Japanese children are indeed largely surrounded by the old customs that have kept family life almost unchanged for centuries.

—REFERENCE-OUTLINE for Organized Study of JAPAN—

IT IS important to observe how Japan, whose geographical situation so strikingly resembles that of Great Britain, has come to play a part in Asiatic affairs closely akin to the British world policy. Less than a century ago Japan was an isolated island state; its people pursued agriculture and primitive crafts, unmindful of the march of Western civilization. Within the span of one man's lifetime Japan became a power in world politics and commerce. The islands were no longer able to produce enough food for the expanding population; so the Japanese were forced to build up manufacturing industries and to develop a foreign commerce to dispose of their manufactured products. The Japanese emigrated in large numbers to foreign lands, particularly to China, Malaya, the islands of the Pacific, and the western coast of North America. The Japanese government, feeling the need of additional territory for commercial expansion, seized every opportunity to gain a foothold on the mainland of Asia. To support its claims and gain an equal voice in international politics, Japan built a powerful navy and organized a large and efficient standing army. A victorious war with Russia, an alliance with Great Britain, and a strategic position during the first World War advanced the nation's prestige and added new possessions. Dominance in the vast area of "Greater East Asia" became the object of imperialist-minded Japanese statesmen. This prompted Japan's invasions of China in 1931 and 1937, and its pursuit of an even more aggressive program during the second World War, culminating in the attack in 1941 upon the United States.

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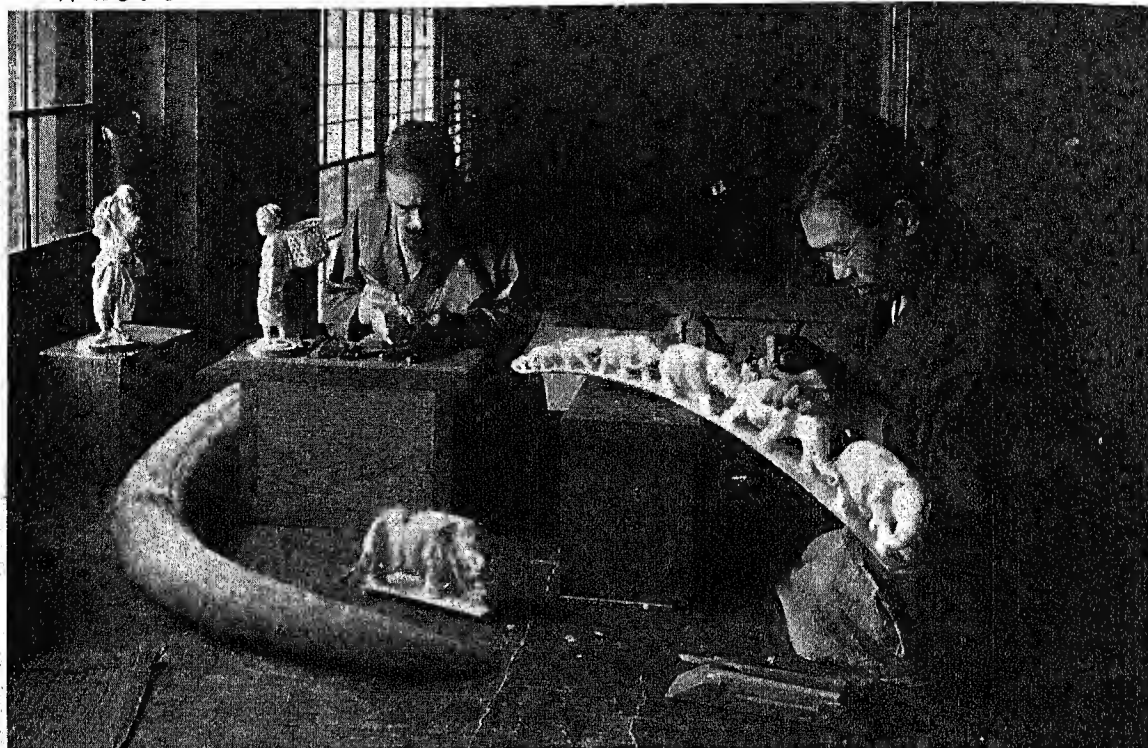
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Where BEAUTY RULES the HUMBLEST HOME



No elephants in the circus world were ever so celebrated as those elephants the Japanese ivory carver has caused by the wizardry of his skill to march in procession out of an elephant tusk. That scholarly looking gentleman is none other than Komei Ishikawa, the greatest ivory carver in Japan and, therefore, the foremost ivory carver of the world! The love of art is one of the most distinguishing characteristics of the Japanese, and they carry it into everything. The Japanese boys and girls, for example, devote the same loving care to making the letters of their alphabet that artists in other lands do to painting or drawing. Even kitchenware in Japan is usually a work of art.

JAPANESE ART AND ARCHITECTURE. A love of the beautiful in nature and art is the inheritance of every Japanese child. The sense of beauty is universal among the people, and one of the greatest charms in this land of many fascinations is that in the daily life of even the humblest there are exquisite taste and refinement, which encourage her artists to produce their marvelous porcelains, tapestries, and color prints. Daily toil and beauty, instead of being things apart, are inseparably connected in the lives of the Japanese. The iron kettles, cheap earthenware, and blue and white towels used by the poor are as artistic in their way as the expensive art objects of the rich. The people seem incapable of producing anything that is crude or ugly.

This love of the beautiful is strikingly evident in Japanese architecture. If we visited Tokyo or any other large Japanese city today, we should see some buildings like those in America. But we should also see many examples of native Japanese architecture—quaint many-storied pagodas; palaces with massive stone terraces; and wooden houses with open verandas and roofs of beautiful tiles or homely thatch that flare upward at the edges.

The temples, symbolic of Japan's intense religious life, are the loveliest and most interesting of show

places in this ancient country. Korean missionaries brought the Buddhist religion to Japan in 552 A.D., and with it they brought the Chinese style of temple architecture. Their houses of worship were set on rock foundations and had lattice walls filled in with plaster, or, more commonly, no walls at all. The pagoda, a tower with each story marked by a flared-up roof, was extensively used. The roofs were constructed with red, dark green, or gray tile, often ornamented at the edges and supported by bracketed pillars. Always, in the temple yard, were the *torii* (meaning "bird rest"), a sort of gateway of two straight posts surmounted by a beam with turned-up ends. These were votive offerings to the divinity, and sometimes a long series of them led to the temple and gave the effect of a pergola.

Shinto Temple Decorations

The earliest temples were extremely simple, but as time went on ornamentation was increased. In the 17th century, when the old Shinto religion was revived, temples were resplendent with red lacquer and gold, with beautiful designs chiseled in the gateways, and paintings and carvings in the interiors. Unstained wood, occasionally varied with lacquer, continued to be used for the exteriors. Most of the temples now shown to tourists in Japan are Shinto



JAPANESE PRINT OF THE 18TH CENTURY

JAPANESE PRINT OF THE 18TH CENTURY

THE print reproduced on the preceding page is a portrait of a famous Japanese beauty of the 18th century called Ujiyama. It is the work of Hosoda Eishi (1746-1829), one of the most distinguished print makers of his time.

Ujiyama is posed to represent the poet Kisen Hoshi. She is seated at her low desk of red lacquer, holding a writing brush. She seems to be thoughtfully considering some verses she is about to set down. On the table before her is a long decorative card called *tanzaku* used especially for poetry writing. Beside it is a book and at Ujiyama's elbow stands an ink-stone used for grinding ink, with a small water pot for mixing the ink next to it. Near by is the box from which these implements have been taken. It is now covered with a silk cloth in which lies a bronze brush-rest in the form of a dragon. A manuscript box and a bronze candlestick with a floating wick stand on the floor.

Hosoda, the maker of this print, is particularly noted for his beautiful composition of figure subjects. His work is also remarkable for the refinement of his drawing and his success in handling subtle color combinations. These are obtained despite the limitations of wood-block printing, wherein each shade of color necessitated the cutting and exact registration of a separate block.

shrines of this later period. In all of them, wood is the chief material. Stone is used only for lanterns and other ornaments, tile only for roofs, and stucco only occasionally in the walls.

The architecture of palaces was always distinct in many ways from that of temples and common houses. In the 13th century, the rulers lived in gorgeous castles, a famous example of which is Golden Pavilion at Kyoto. It is square in design and its second story is entirely encrusted with gold-leaf. The roof has the same gently up-curving sweep that characterizes the temples.

Feudalism held sway in Japan in the 13th and 14th centuries and the rulers of this period lived in mighty strongholds, built on solid rock, with barred windows and tile or plaster walls. Copper dragons guarded the cornices, and the interiors were lavishly decorated with paintings and lacquer.

To Resist Quakes

Such grandeur, however, has never been shared or even imitated by the mass of Japanese people. Their houses are of the most fragile construction and simple to the last degree. This lightness of construction is in part a precaution against earthquakes. At the first sign of disturbance the light walls can be removed from their grooves and all the family's light belongings taken out into the open, and there are few beams or other heavy objects that can fall and cause injury. Thatched roofs give an added advantage to rural people and the poor of the cities, but wealthier families usually have houses with tile roofs—a feature of construction that has

added much to the number of casualties occurring in the earthquake disasters in Japan.

Beautiful Japanese Gardens

Though Western conveniences and ideas have come in during the past few decades, most Japanese families live much as their forefathers did. They abide by the old Japanese saying, "First we make the garden and then we build the house." These lovely gardens,

A TRULY "PICTURESQUE" PEOPLE

Whether you visit the simple hut of the fisherman shown at the left, or go among the Ainus of the north, two of whom are greeting each other with formal gestures in the picture directly below, or call on a middle-class family, like the one on the veranda in the lower picture, you will almost always find a simple grace and sense of beauty reflected in dwellings and dress.

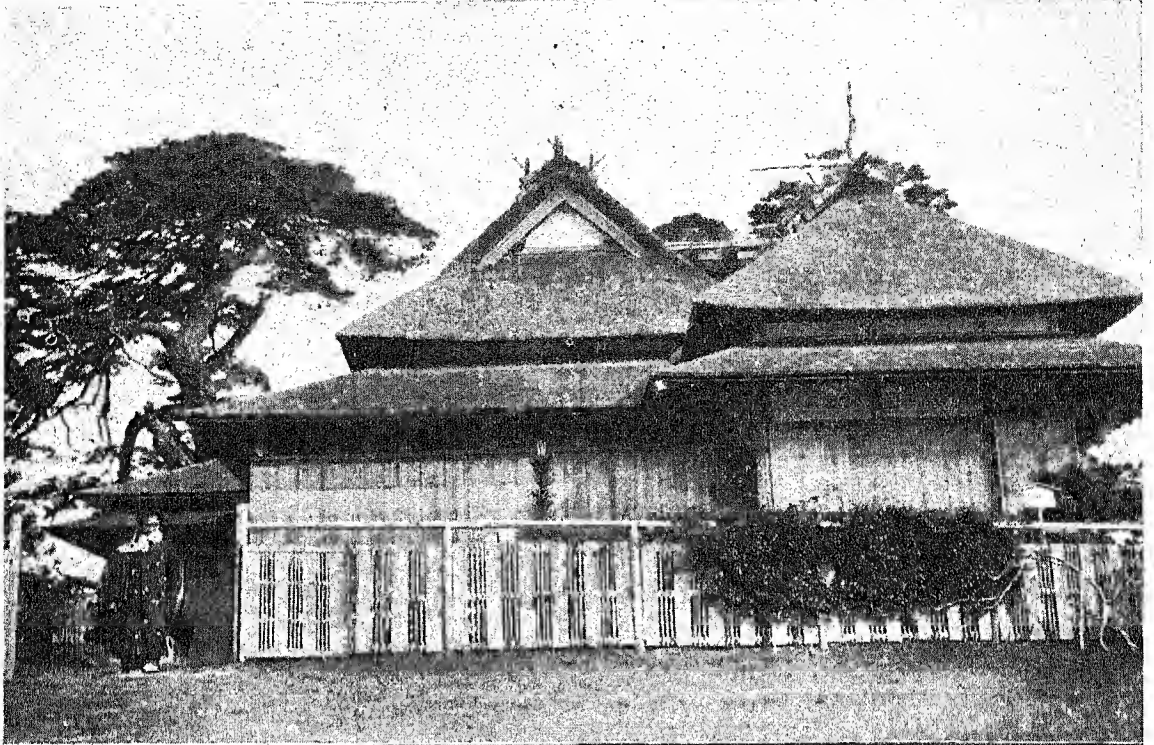


which flourish even in the hearts of cities, are usually hidden from the street. Entering through an unimposing gateway, one is surprised to see them—lovely vistas of grass and flowers, odd-shaped dwarf trees, streams with arched bridges above them, and little thatched-roof tea houses no larger than a child's playhouse dotted in along a winding path.

Sliding Walls

The house itself is so fragile and so quaint that it too reminds us of a playhouse. It is of wood and usually has an open veranda where everyone removes his shoes before entering the house. The walls are of rice-paper, held by a light lattice work, and are placed in grooves so that they slide back and forth. Westerners marvel that, though these walls are light, they never

AN EXCELLENT EXAMPLE OF JAPANESE DOMESTIC ARCHITECTURE

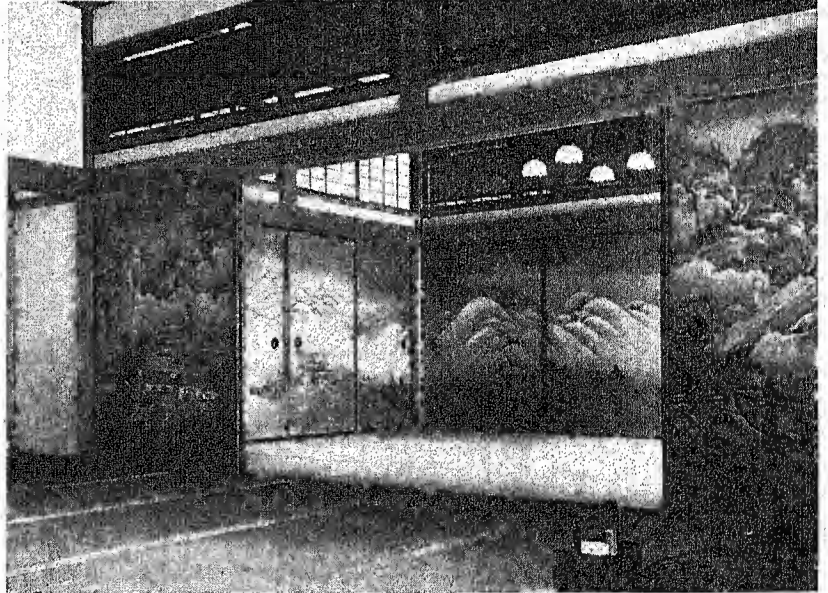


The airy walls of the graceful house above are set in grooves to slide back and forth and thus cut off or combine rooms. The walls are made of waterproof paper held by light lattice work. The beautiful wall panels below are the chief decorative feature of the interior. The house belongs to a wealthy family in a suburb of Tokyo.

warp, a fact which shows the skill and ingenuity of Japanese workmen. Heavier wooden or glass sliding panels outside the paper walls close in the house at night or in stormy weather. There are no bedrooms or dining-rooms, but simply a series of square rooms divided by sliding screens. The floors are covered with straw mats. At night the bedding is taken from the closets and spread on the floor. At meal-time, tiny tables are brought in and set before the guest as he sits on a bright cushion placed on the clean, mat-covered floor for the meal.

The Etiquette of Entertainment

In one corner of the space set aside as a reception room is a square platform. This is the place of honor and guests are usually asked to sit just in front of it. On it is a lovely vase or other treasure with a long scroll-like print hanging on the wall



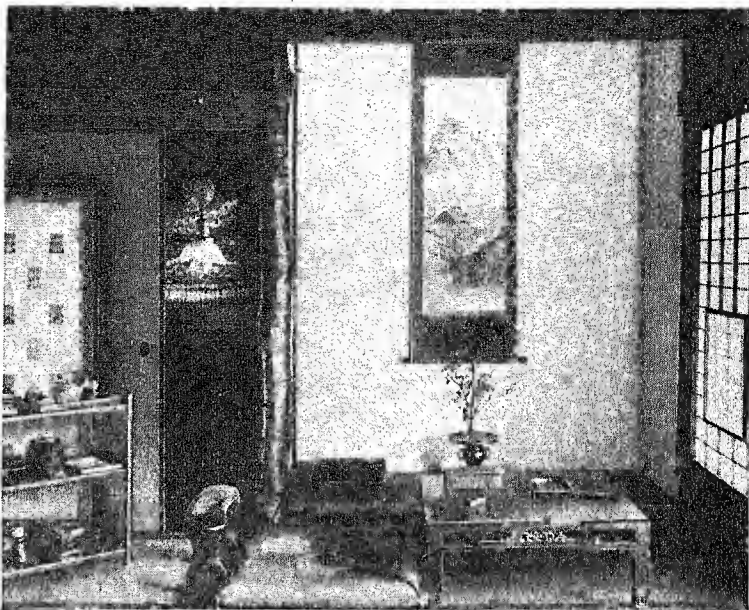
behind. These objects of art are changed frequently. There may be a small table under an old print, a tiny writing desk with a slanting top, and several screens. Otherwise there is no furniture—no beds, chairs, or couches in the whole house. Light filters in all day through the paper walls; and the whole effect, so strange to our eyes, is a perfect setting for these small and gracious people in their colorful costumes.

As one can imagine, Western innovations furnish odd contrasts in some of these quaint interiors. A family may have a modern American stove towering above the foot-high tables and floor cushions, or perhaps a modern bathroom, its porcelain fixtures looking massive and strange against the paper walls. These Western ideas, however, have not been able to overwhelm a culture and a way of life so old and so firmly established in the traditions and temperament of the people.

The Difficult Art of Writing

In Japan everyone is to a certain extent an artist. A glimpse into the training of the children will help to show how this has come to be. In the Japanese language there is but one word, "kaku," for writing, drawing, and painting. From this it is easy to see that writing has always

JAPANESE ART MAKES LITTLE USE OF FURNITURE



Honored guests in the Japanese home are entertained in that dainty corner shown in the top picture. A vase or other art treasure is placed on the platform, and a print or decorative panel is hung above it. These decorations are changed often. Even in hotels the Japanese use little furniture, as you see at the left. Patrons sleep on the floor. The last picture shows a scholar writing a long scroll in large characters. He finds the floor more convenient than a desk.

been looked upon as one of the fine arts. At least three or four thousand Chinese characters, or "ideographs," must be mastered for daily use. In learning to form these graceful characters accurately and beautifully, the Japanese child also learns the essentials of painting technique. He must learn to form the characters not only with a pen, but also with a brush. This develops his ability to make quick, sure brush strokes directed not from the wrist, but from elbow and shoulder. The brush writer can make no corrections and no erasures, for he writes on a porous paper which instantly absorbs the India ink. And he has to learn to work kneeling when the scroll is long.

The result is to produce strength, precision, and grace. Writing is an art that can seldom be mastered by a grown person, but when acquired in childhood it gives skill and deftness in other forms of art. One who has learned to write Chinese ideographs well can be taught to do almost anything with the fingers. No wonder Japanese think as highly of skill in writing as we do of painting or drawing.

Learning to Write Prepares for Painting

After the art of writing has been acquired, painting is the next step. For the Japanese child, no matter how young he may be, looks forward with eagerness to the time when his fingers will be sufficiently skilled to picture the beauties of the cherry blossom season, the moon rising over a pine tree, or the grandeur of Fujiyama, the sacred mountain of Japan. Many a laborious hour does the young artist spend in learning

how to make a single stroke. The beauty of Japanese painting lies in its half-veiled suggestions; the soul of things must be represented rather than their visible forms. These simple yet comprehensive precepts the teacher is at great pains to impress upon his pupils. Over and over again they strive to gain mastery of the few bold strokes that represent a river, or the straight lines picturing rain, blades of grass or shoots of bamboo. But the painstaking labor is not so irksome to a Japanese child as it would be to an American. It is often said that Japanese children are not so original in their thinking as the children of the West because of the strain on their youthful memories in mastering the written language. One thing, however, may surely be claimed for them—a genuine love of art, which makes pleasure instead of drudgery of the many long hours spent in mastering the use of the brush.

The appreciation of the beautiful is seen again in their love of flowers. Flower arrangement is taught as one of the arts, and much time is spent in learning, by twisting, bending, and clipping, to make each blossom and twig look as though it were actually growing. The making of miniature landscape gardens and pictures out of smooth white sand and tiny stones on lacquer trays is another artistic pursuit that delights Japanese children and heightens their feeling for design.

All this has given rise to the assertion that there are no mechanical arts in Japan because all such have been raised to the position of fine arts. This is surely true of the work of the potter, the wood-carver, and the craftsmen who produce such marvelous results in cloisonné, damascene, ivory, bronze, and lacquer. There is no sharp line of separation between artist and artisan, when both do their work with loving care and wonderful skill.

The potter's wheel, according to tradition, was introduced into Japan from China in the 8th century A.D. Five centuries later a Japanese potter discovered the art of glazing. Small jars of stoneware with brown glazes flecked with black were his first production. In 1598 the Prince of Satsuma invaded Korea and brought back with him 17 skilled potters, who taught the making of a ware which was called

"Satsuma" in his honor. This is a glazed earthenware of firm texture, much like porcelain, decorated in color, and with the surface "crackled" just perceptibly. This so-called Satsuma ware is now made in a number of Japanese cities and is very popular for

A MASTERPIECE IN BRONZE



This beautiful vase illustrates the skill with which the Japanese use enameling in the decoration of metal. The outlines of the figures are formed of metal strips and the space between is filled in with colored inlays. This specimen forms part of the noted Japanese collection in the Victoria and Albert Museum, London.

export trade. At the close of the 16th century a Korean potter at work in Japan discovered on Mount Izumi (in Hizen province) a peculiar clay needed to reproduce the blue and white porcelains of China. This "Hizen" ware, known also as "Arita," from the town of its manufacture, and "Imari," from the place of exportation, is today one of the finest wares made in Japan. The two centuries from 1645 to 1845 were the golden age of Japanese pottery. During that time the work was carried on under the patronage of noblemen and gentlemen of wealth, and no expenditure of time or toil was considered too great. Since the opening of the country to western influence, the Japanese have catered to western markets, so that pottery work has suffered through commercialization.

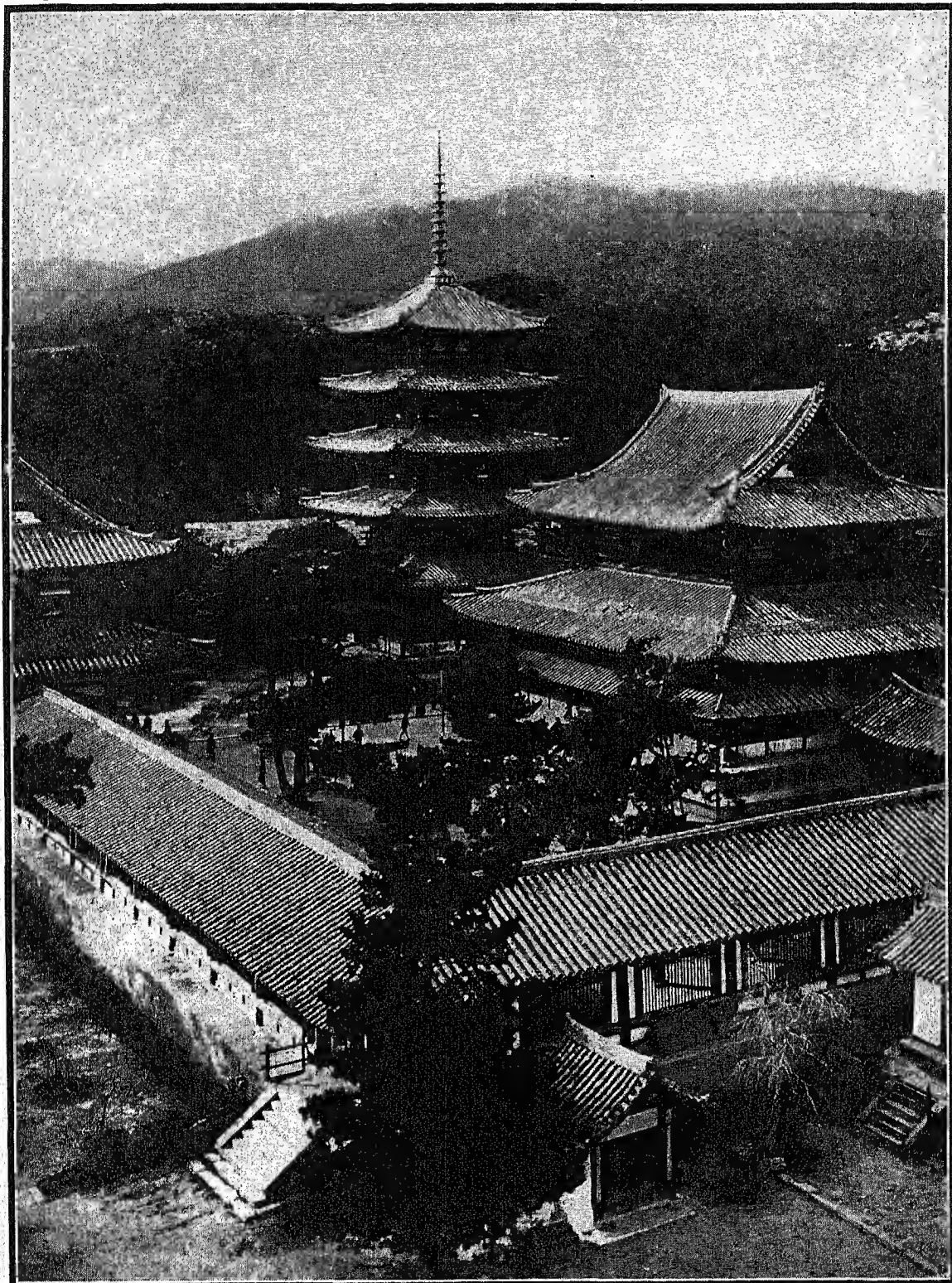
In the museums of Nara and Kyoto may be seen some wonderful examples of the ancient wood-carver's art, in the form of images believed to date from the 6th and 7th centuries A.D. At the end of the 16th century there was a new development in wood-cutting, in the carved decorations of temples, colored in gold and vermilion, the favorite Buddhist colors. These carvings represent flowers, birds, angels, and dragons, and appear on pillars, gateways, ceilings, and palisades. One of the finest gems of the wood-carver's skill is the "netsuke," a little figure designed to fasten the cord on a gentleman's sash or on the string of his tobacco pouch. The faces of these tiny netsukes have wonderful expressiveness.

The most notable piece of bronze in Japan is the Daibutsu, or Great Buddha, at Kamakura—nearly 50 feet high—which has been described as

A statue, solid-set,
And molded in colossal calm.

The image was formed of sheets of bronze, cast separately and finished off with a chisel. In ancient times the bronze-maker devoted himself almost exclusively to the making of images and temple

JAPANESE TEMPLE BUILDINGS—1,300 YEARS OLD



What are believed to be the oldest wooden structures in the world are included in this famous Horyuji temple group near the town of Nara, once capital of Japan. These distinguished examples of Japanese-Buddhist architecture date from the early 7th century. Rising from the center of the group is the typical five-storied pagoda, a design borrowed from China.

adornments. Nowadays he makes vases, bowls, lanterns, and statues for commercial purposes.

This is also true of the ivory carver and the master of damascene art. Instead of idols the ivory carver is making statuettes, fans, and umbrella handles; instead of fashioning Samurai sword hilts, the worker in damascene is devising fashionable jewelry. In this ancient art of inlaying steel and iron with silver and gold, as in the elaborate enamelware known as *cloisonné*, the Japanese workman has no superiors. (See Enameling.) Lacquer, too, is an art product in the making of which Japan cannot be excelled. The lac used is made from the poisonous sap of a tree belonging to the sumac family. It is applied to the wood in thin layers, and after being dried in a steam chest is carefully rubbed down and polished. The whole process is repeated over and over with the utmost patience, until the desired finish is obtained.

Of all the Japanese arts, the engraver's art of color printing is the one most admired in Europe and America. It unites the dexterity of the wood-carver and the skill of the painter, to form an art with power in every line and likewise grace and lightness of touch. The artist first draws his picture on transparent paper. Then the wood-carver pastes the drawing on a cherry-wood block, and dexterously cuts away the wood between the lines. Finally the printer mixes his vegetable color with a rice-paste and applies it to the engraving. A sheet of paper is placed on the inked block, and it is pressed down by rubbing with a pad. With painstaking care a separate block is made for each color, and color after color is printed until the original conception reappears in the finished print.

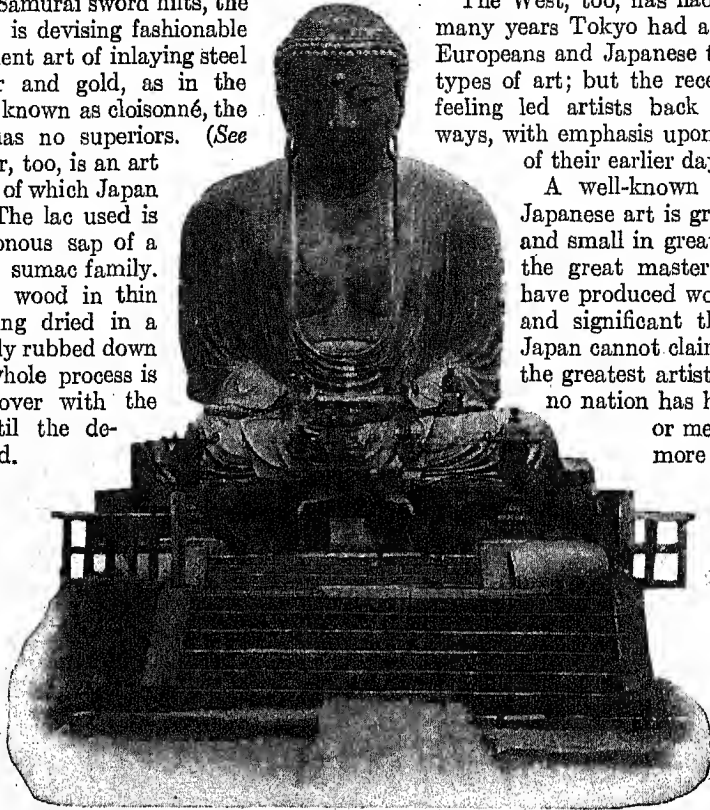
The greatest triumphs of color printing came during the 18th and 19th centuries, for that was the time when the great masters lived—Harunobu, Utamaro, Toyokuni, Hiroshige, and Hokusai—men almost as well known in the West as in the East. Indeed, one of the finest collections of the work of these great artists is to be found in the Boston Museum of Fine Arts. Collections of prints that found their way to Europe in the 19th century aroused great admiration, and had great influence upon artists of the West generally. The modern school of "impressionism" which began in France was partly inspired by the

Japanese artist. Members of this school began striving to give the "impression" of the thing without picturing the whole of it, so that there came a decided change in their feeling regarding color. This showed itself in part in a fondness for more delicate tones.

The West, too, has had its influence. For many years Tokyo had a school where both Europeans and Japanese taught the Western types of art; but the recent rise in national feeling led artists back to their ancestral ways, with emphasis upon the fine traditions of their earlier days.

A well-known maxim says that Japanese art is great in small things and small in great. True it is that the great masters of European art have produced works far more noble and significant than the Japanese. Japan cannot claim to have produced the greatest artists of the world, but no nation has had finer craftsmen

or men who would work more painstakingly for perfection in details. While it is true that her artists have invented little, it is equally certain that they have invested with new grace and charm whatever they have borrowed from other lands, and their style has affected European art.



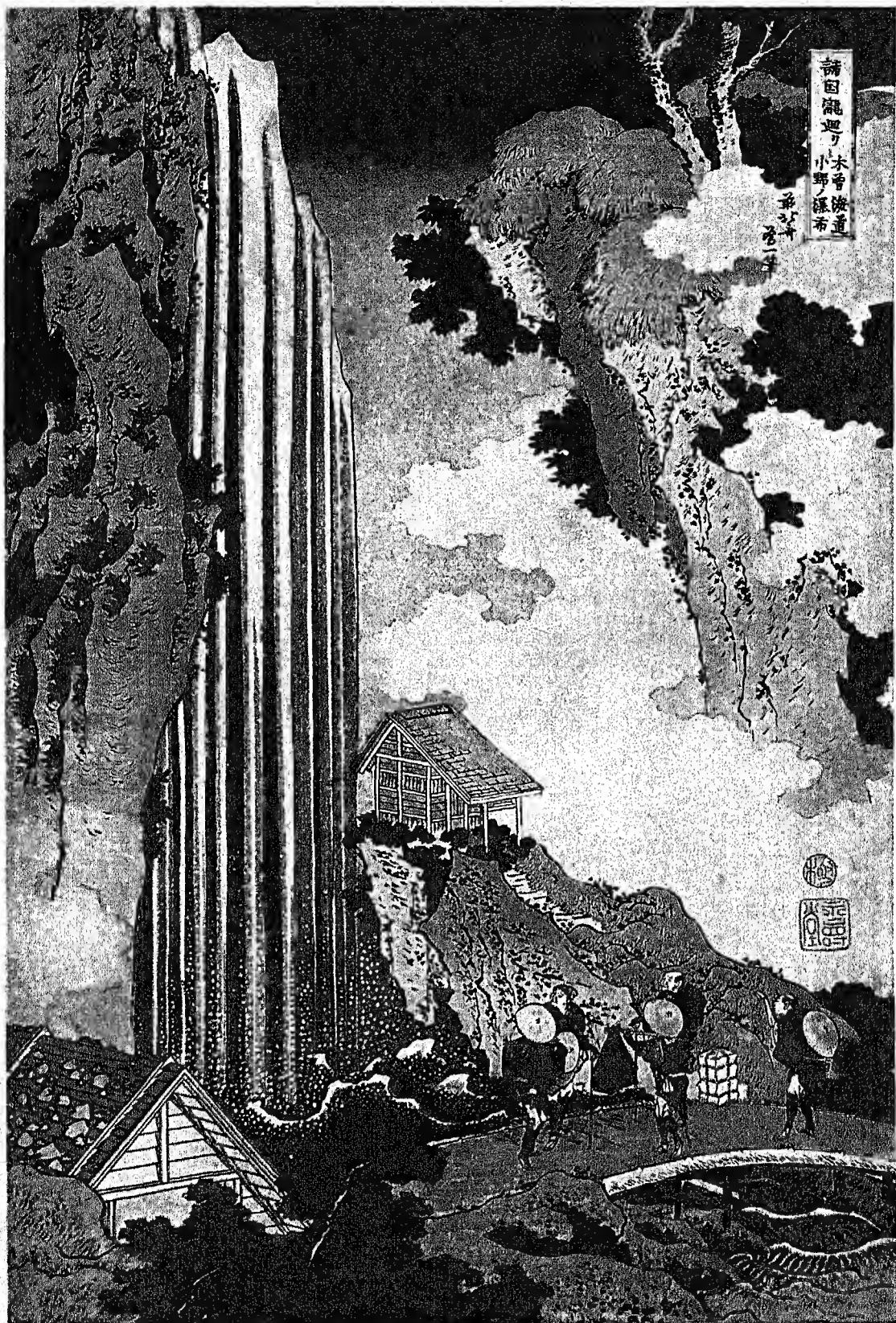
The Daibutsu, or great Buddha of Kamakura, Japan, is the most famous statue of Buddha in the world, both because of its colossal size and because of the impression of intellectual power and passionless serenity it presents. It is 49 feet high, the face is 8 feet 5 inches long, and the eyes, made of pure gold, gaze down through lids nearly 4 feet long.

JASMINE. The jasmines are noted for the fragrance of their white, waxlike blossoms. They are native to the warm parts of the Old World and cannot survive northern winters if grown outdoors. The commonly cultivated white jasmine (*jessamine*) is a native of Persia. It grows from 6 to 10 feet high, and its weak stems need support. As a climber it may grow 30 feet long. It can be grown from seed or from cuttings taken in the summer or autumn.

Perfume is made from jasmine blossoms in France and Algeria. In China, jasmine is used to flavor tea, and in Turkey, pipe stems are made from the wood.

The Carolina yellow jasmine is a gelsemium, not a true jasmine. This twining evergreen shrub with yellow flowers grows profusely in the southern states. The root yields a nerve-deadening drug.

Scientific name of common white jasmine, *Jasminum officinale*. It has white flowers, in clusters, with 5 to 8 cleft calyx and a slender corolla tube. Leaflets are in pairs, with larger leaflet at the tip. Scientific name of Carolina yellow jasmine, *Gelsemium sempervirens*.



From the Clarence Buckingham Collection

By courtesy of The Art Institute of Chicago

ONE OF HOKUSAI'S FAMOUS WATERFALLS

ONE OF HOKUSAI'S FAMOUS WATERFALLS

MODERN in spirit and technique appears the work of the famous Hokusai Katsushika (1760-1849). So true is this that his prints are more highly regarded in western countries than among the more conservative Japanese. Many American and European critics rank him among the foremost artists of all time. The "modern" quality which he displayed so far ahead of western artists is well shown in the print reproduced on the preceding page.

This is one of a series of eight he made of waterfalls. Observe the straight, almost geometric, treatment of the falling water and the originality in the handling of perspective in the pine-crested cliff which overhangs the chasm at the right.

Hokusai's life was like his work—independent of the opinion of others. He preferred poverty to the easy life of a fashionable artist, and even after his earnings grew with his fame, he lived simply and worked hard, producing a large number of paintings all of which held to a high standard. Although he lived to be 89 years old, he is reputed to have said on his deathbed: "Had I only lived five years longer, I might have become a great painter."

The colors used in printing from his wood blocks were all made from vegetable dyes. When exposed for years in frames, these have often faded, so that many collectors imagine his original colors to have been subdued. But our picture, reproduced from a print that has never been for long out of its original wrappings, shows a bold, incisive use of color values.

The WORLD'S RICHEST Tropical ISLAND—JAVA

Extent.—East-west, Cape Sedano to Java Head, 635 miles; north-south, 117 miles. Area: Java, 48,504 square miles; Madoera, 1,725 square miles. Population: Java, 39,755,000; Madoera, 1,965,000.

Climate.—Monsoon climate; mean temperature at sea level 79° F., varying about two degrees in a year; annual precipitation, 70 to 250 inches; dry season, especially marked in eastern half of Java, May to September.

Administrative Areas.—Provinces: West Java, Central Java, and East Java (including Madoera). Native states: Djokjakarta Sultanate, Soerakarta or Solo Sultanate, and Preanger regencies.

Cities.—Batavia (capital, 435,000), Soerabaja (340,000), Semarang (220,000), Bandoeng (165,000), Soerakarta (165,000), Djokjakarta (135,000); Meester Cornelis, Malang, Pekalongan, Buitenzorg, Koedoes, Cheribon, Magelang (50,000 to 100,000); Kediri, Tegal, Madioen, Probolinggo, Pasoeroean, Soekaboemi, Poerwokerto, Tjilatjap, Biltar, Grisee, Tasikmalaja, Banjoewangi, Poerworedjo (25,000 to 50,000).

Products.—Sugar, rice, corn, cassava, sweet potatoes, peanuts, soybeans, copra, tea, coffee, tobacco, rubber, quinine, palm oil, kapok, agave, teakwood; petroleum and its products; textiles, tires, cigarettes.



Batavia, capital of the Netherlands Indies, has its canals and canal boats, like the cities of the Dutch homeland. But the houses are very different. The house at the left has shutters to keep out the hot sun.

JAVA. Few places show such striking contrasts as Java, the richest island in the East Indies and the heart of the Netherlands' eastern empire. First, this island is near the Equator, and heavy rains tend to clothe much of it with tropical forests as dense as those of the Amazon or the Congo. In such regions the people are usually few as well as indolent and backward. But Java has a larger population than any other region of comparable size. For every square mile it has about 820 people.

A YOUTH OF JAVA



The high collar is "official dress" and shows that this lad is a clerk or an official.

Though it is smaller than the state of New York, it has more people than all the states of the Atlantic seaboard from Maine to Virginia. And these people are industrious and healthy. So neat and well kept are the towns and the plantations that travelers call Java a "tropical Holland."

Second, the native population has an ancient civilization, little changed by long contact with Europeans. Food, dress, and customs are much the same as they were centuries ago.

Yet much of Java's wealth comes from meeting the world's most modern needs—needs for commodities such as petroleum and rubber.

Strangest contrast of all, this great, rich island is controlled by the little Kingdom of the Netherlands, which is on the other side of the globe from it. This ruling country is only about a quarter as large as Java and has only a fifth as many people. But the far-sighted Dutch policy of treating the native people as equals,

even to intermarriage with them, has made most of them as loyal as the Dutch settlers themselves.

Mountains, Volcanoes, and Valleys

The long, narrow island may be thought of as a ridge of mountains with low coastal plains. It extends about 600 miles from east to west, and most of it is from 40 to 50 miles wide. The ridge is capped with volcanoes, some active and some extinct, and it is broken across by some ten valleys.

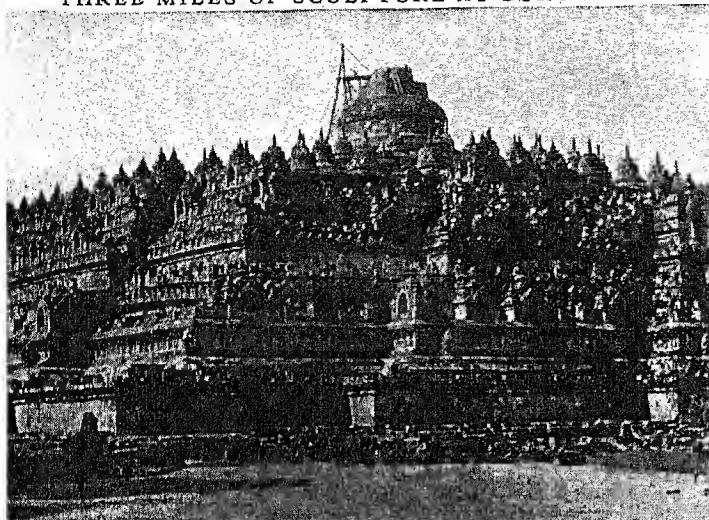
Because of this central ridge, each side of Java has a wet and a dry season, but at different times. (The reason is explained in the article East Indies.) Thus for part of the year the people enjoy some relief from steaming equatorial heat, but frequent equatorial showers even in the dry season maintain a rich plant life the year around. The high ridge also gives a change from a tropical climate at sea level to a climate with seasonal frosts near the summits. This temperature range permits a wide variety of crops to be grown.

The volcanoes contributed to Java's riches by laying a cover of ash over the island. This ash makes the finest of soil, and constant wash by rains has spread the soil flat in the valleys and on the coastal plains, thus making cultivation easy.

Strange and Familiar Plants and Animals

As a result of this moist, warm climate and of the variation in altitude, Java has an exceptionally rich and varied plant life. For a third of a mile above sea level, the plant growth is tropical, with palms, figs, jasmine, bamboo, acacia, and vines of the rattan palm and of peppers. Above this is a subtropical level, with magnolias, orchids, and ferns. Nearly a mile above sea level, on the central ridge, the forests

THREE MILES OF SCULPTURE AT BORO BUDUR



This is the central portion of the great Buddhist stupa, or temple, at Boro Budur. It was built in the 8th century. The structure is a series of terraces built around the hill. Three miles of reliefs portraying the life of Buddha line the terraces.

begin to resemble those of the United States, with oak, chestnut, and maple. Here one sees azaleas, rhododendrons, raspberries, and blackberries.

Some 20 peaks rise above 10,000 feet; the highest is Mount Semeroe (12,060 feet). On their higher slopes frosts occur and cool-climate plants grow, such as ironwood, myrtle, elder, barberry, and the Javanese edelweiss. In the drier eastern region there is savanna instead of forest, with trees along the rivers. This is the teak-tree region.

Most of the animals are forest-dwelling types. Among the many birds are weaverbirds, parrots, ducks, and peacocks. One kind of swift makes a gluey nest which the Chinese prize for soup. There are huge, gaily colored insects, and some of the spiders are large enough to catch birds. Among the reptiles are pythons, cobras, crocodiles, and lizards. One of the lizards is so large that it attacks poultry.

The most dangerous mammals are the tiger, the one-horned rhinoceros, and the leopard. Other large animals are the banteng (a wild ox), wild pigs, and deer, including the muntjac and musk deer. Smaller animals include apes, squirrels and flying squirrels, rats, hares, and the scaly anteater. Fish and shellfish abound in the sea and the rivers, and are an important part of the food supply. The Chinese raise fish on the rice fields between crops.

"Estate" and "Native" Agriculture

Nearly two-thirds of the land is cultivated. Only one-twentieth is in European plantations or "estates." These estates employ only about one-tenth of the native farmers, but they produce most of Java's wealth, because they produce crops for export.

The plantations in the hot lowlands grow rubber, cotton, sugar cane, coconuts, and tobacco. On the subtropical uplands they grow tea, quinine, and coffee.

Java normally supplies nearly all the world's quinine, but the coffee industry has suffered from Brazilian competition. Only two of the major exports, cassava and kapok, are largely grown by natives on their own land, but these are important because they make up most of the world's supply.

The native farmers provide most of the food. Nearly half of the cultivated land is irrigated and planted to rice. Other food crops are sweet potatoes, beans, cassava, and, on the subtropical uplands, corn. Sheep, goats, poultry, and humped cattle are important food animals. The water buffalo is the chief work animal. But despite the marvelously fertile soil and government farm aid, the food supply is short and rice must be imported.

Industry and Transportation

To provide work for some of the teeming mass of natives, the government in recent years has encouraged the growth of industry. Most of the plants are owned by Europeans or other aliens; natives serve as workmen. The chief industries are those that process Java's petroleum,

FOREST SETTING FOR A VILLAGE



This scene can be matched almost anywhere in central and western Java. Trees grow riotously, except where land is cleared for crops.

rubber latex, tobacco, and other export products. "Native industries" make pottery, parasols, hats, rattan ware, textiles, and leather goods. Petroleum wells and refineries in the north-central part of the island between Semarang and Soerabaja supply about one-eighth of all the Netherlands Indies oil. When the second World War broke out in 1939, the government tried to stimulate shipbuilding and metal work; but this effort was handicapped by lack of materials for heavy industry.

Transportation and Cities

The ports are connected by coastal steamers, and the island is laced with some 3,000 miles of railroads and tramways, largely state-owned. Of 17,000 miles of roads, about one-third are good for motor traffic. This compares in density with Kentucky, Oklahoma, and Florida.

Despite its huge population, Java has only a few large cities. Only about one-twentieth of the natives live in cities or towns.

The largest city and the capital of the Netherlands Indies is Batavia, near the western end. It was founded in 1619. Because of its many canals it has been called "Venice of the East." Most European business houses and residences are in a new section south of the old town. The port, Tandjong Priok, about five miles away, is the importing center for the Indies.

The second largest city is Soerabaja (Surabaya), near the eastern end. The Dutch developed it as their chief naval base and sugar-exporting port. Other port cities are Semarang and Cheribon, near the middle of the northern coast. On the Indian Ocean side the only good port is Tjilatjap (Chilachap).

The largest inland city is Bandoeng (Bandung). An elevation of 2,346 feet gives it a comfortable climate, and so the Dutch have established here many governmental executive departments and educational institutions. Between Batavia and Bandoeng is Buitenzorg, famous for its botanical gardens and as the residence of the governor general. Soerakarta, in central Java, is the capital of the largest native state, the sultanate of Soerakarta or Solo. (See names of these and other cities in the FACT-INDEX.)

The Government and the People

Before the upsets caused by the Japanese attack in 1942, the Dutch colonial government had made remarkable progress in improving the condition of the people (see East Indies). Health measures reached practically all, housing was being improved, and elementary education was spreading.

Such efforts have always been handicapped by the reluctance of the natives to do more than needed to win a bare living. They prefer amusement and ease to prosperity. Nevertheless, they have developed and preserved a rich art. Their elaborate temples, ritual

dances, and shadow plays are akin to those of India, and are famed for their imaginative symbolism and technical achievements. Their metal ware is ornate and skilfully worked, and their batik is one of the world's notable textiles (see Textiles).

A People with a Historic Past

Although most of the people are of Malay strain, their past has produced a division into Sundanese in the west and Javanese in the east. The Sundanese are practically pure Malay, with light skins and often with oblique Mongolian eyes. The Javanese are darker, and show many traits of physique, language, and character inherited from the Hindus that long ruled the land. Hindu rule lasted from early in the Christian era until Mohammedan Malays overthrew the Hindus and smashed their culture, about 1478, not long before the first Portuguese traders reached the island.

The Hindus developed the highest civilization in all the East Indies. Many of their immense temples still stand. The most imposing one, at Boro Budur, was built between 750 and 850. Boro Budur was Buddhist, as were most of the others; but

some temples served Brahmanistic gods.

Chinese, who make up about 1½ per cent of the population, conduct much of the store-keeping and small business, as well as the more exacting types of agriculture. Many of them, unlike their countrymen elsewhere, have forgotten their ancestral language. The whites are only a thin group of officials, plantation owners, businessmen, and professional men. They amount to less than one per cent of the population.

(For the history of Java, see East Indies; World War, Second; see also Java in the FACT-INDEX at the end of this volume.)

Separated from Java by a mile-wide strait is the island of Madoera. It is mostly a mud flat, with plant and animal life like that of eastern Java. A government monopoly obtains salt from springs and sea water. The native Madurese live largely by fishing and cattle raising.

JAY, JOHN (1745-1829). During the entire "Critical Period" of the formation of the American nation, John Jay, statesman and jurist, gave liberally of his time and money to support the cause of the patriots.

Descended from an old Huguenot family which had emigrated to America because of persecution in France, he was born in New York City Dec. 12, 1745. In 1764 he was graduated from King's College (now Columbia University) in New York City, and four years later he was admitted to the bar.

Jay's naturally conservative tendency was increased by his legal training, and as a result he at first opposed the Revolution. But when it became clear that war was inevitable he threw in his lot with the patriots. In 1775 he was a member of the New York Com-

OFFICIAL DRESS IN JAVA



A white fez and a cane show the rank of this officer in a local sultan's court.

mittee of Correspondence, and for more than a quarter of a century thereafter he served in public office.

He was a member of the Continental Congress and of the New York legislature, was governor of his state, foreign representative of the United States, and chief justice of both New York and the nation. Besides this his pen was used, first to arouse the people at the beginning of the Revolutionary War, and then to secure the adoption of the Constitution; for with Hamilton and Madison he wrote the essays known as 'The Federalist', which ably urged the people to accept that frame of government.

During the Revolutionary War Jay's most conspicuous services were performed abroad. He was sent to Spain to make a treaty of alliance and secure a loan. In both of these efforts he was unsuccessful, not through any fault of his, but because Spain was not anxious to encourage rebellious colonies. Then he was ordered to Paris in 1782, to aid Franklin and John Adams in negotiating the treaty of peace with England. They were instructed to do nothing without the advice of France; but owing to Jay's suspicions of the French ministry (which proved correct), these instructions were disregarded and a much more favorable treaty was secured from England than the French statesmen were disposed to favor.

Because of this experience abroad, Jay was made secretary of Congress for foreign affairs when he returned. When the new Constitution went into effect in 1789, he was offered by Washington any position he wished under the new government, and he chose the office of chief justice of the Supreme Court. While holding this position, he was sent by Washington to England, in 1794, to negotiate the treaty known as Jay's Treaty. This was a sound and statesmanlike agreement, which settled many differences left over from the Revolutionary War. But it proved extremely unpopular with the Democratic-Republican party of Jefferson, which was bitterly hostile to England, and much abuse was heaped upon both Washington and Jay.

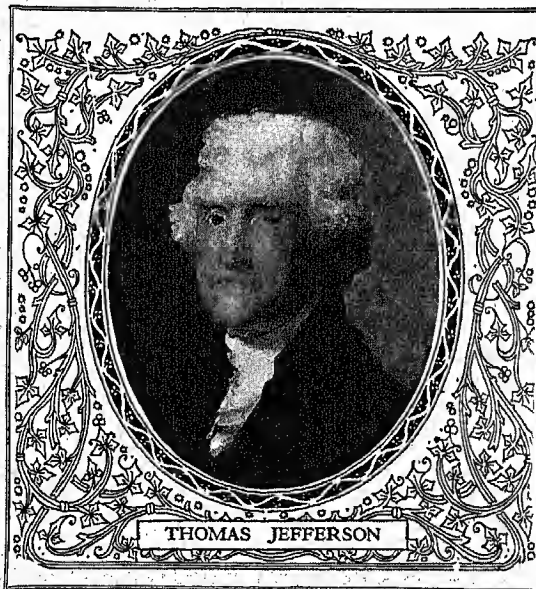
Jay resigned his position in the Supreme Court in 1795 to become governor of New York, to which position he had been elected during his absence in England. He was reelected to that office in 1799, and at the end of his second term he retired to a secluded private life. He died May 17, 1829.

In politics Jay was a Federalist, but he never sanctioned partisan practices. No greater praise can be given him than that pronounced by Daniel Webster: "When the spotless ermine of the judicial robe fell on John Jay, it touched nothing less spotless than itself."

The FATHER of AMERICAN DEMOCRACY

JEFFERSON, THOMAS (1743 - 1826). When Thomas Jefferson asserted in the Declaration of Independence that "all men are created equal" it was to him no mere high-sounding phrase, but an expression of the principle upon which he believed all government should be based. Yet he was by birth an "aristocrat," for his mother was a member of the fine old Randolph family of Virginia. His father, however, belonged to the class of lesser landholders in the backwoods county of Albemarle, Va. Something of Jefferson's democracy may be due, perhaps, to the frontier influences of the Blue Ridge region in which he was born and reared. More of it was due to himself, for in later life he wrote that, after his father's death, "at 14 years of age the whole care and direction of myself was thrown on myself entirely, without a relative or friend qualified to advise or guide me."

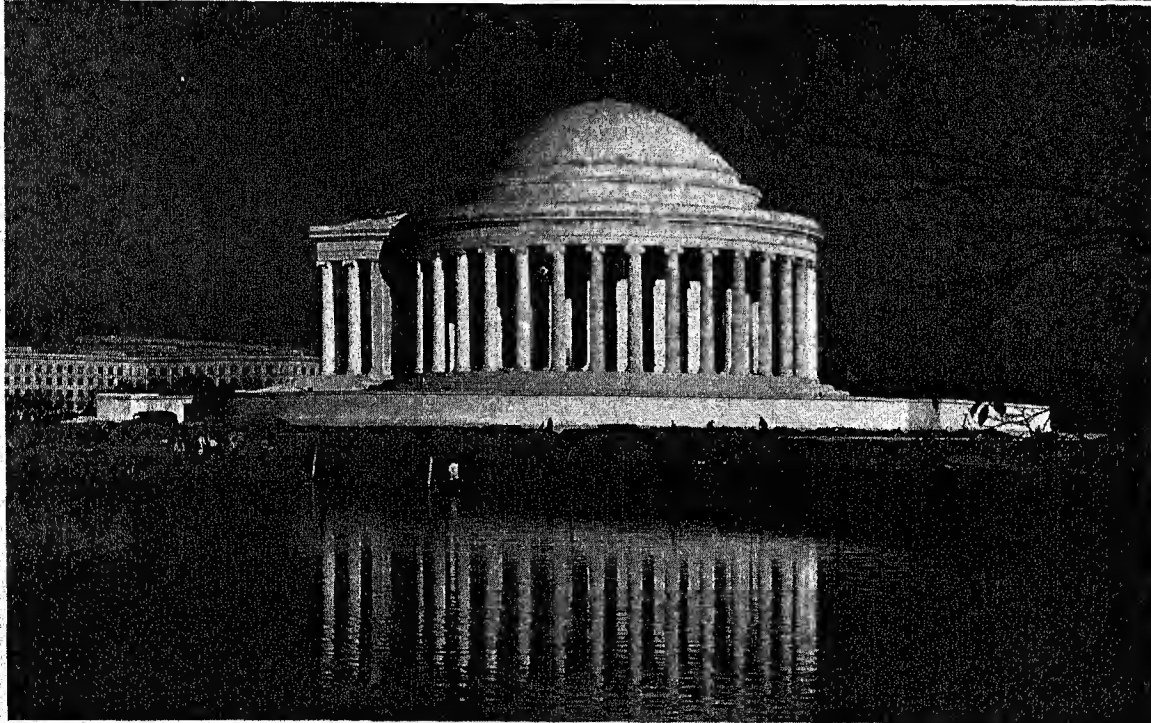
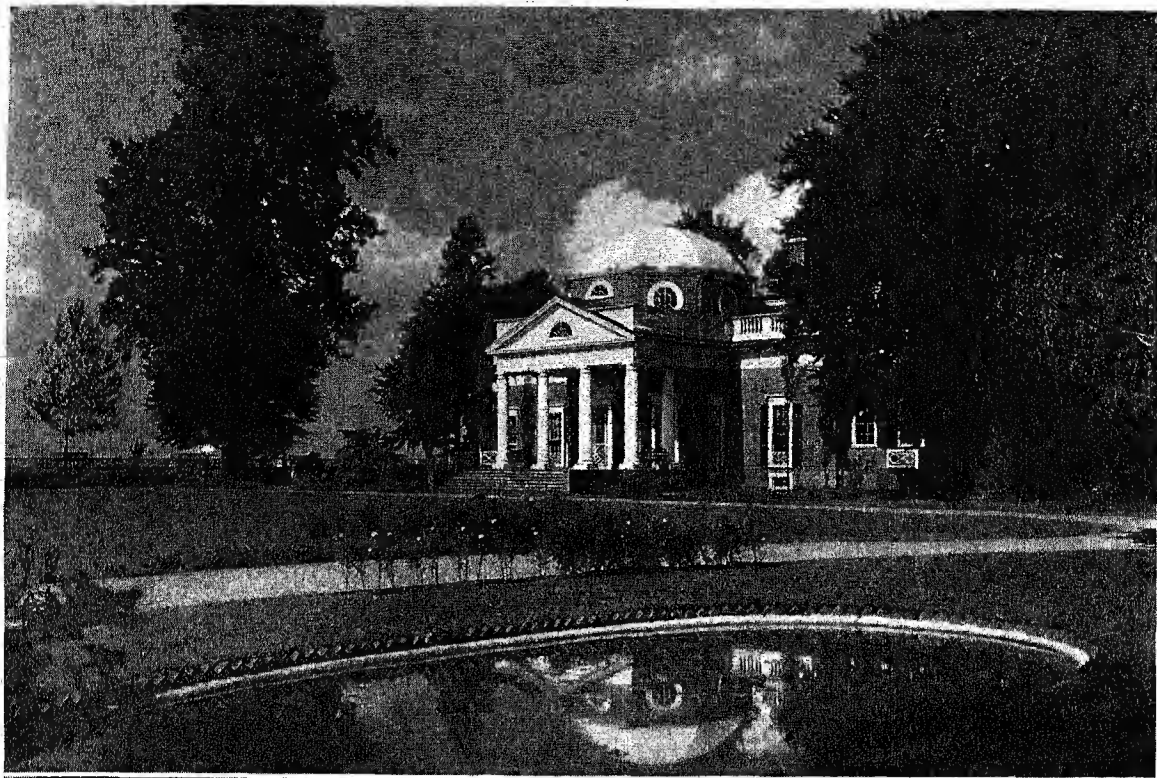
Though the family was not wealthy—for land in that day did not necessarily mean wealth—their



funds were sufficient for Jefferson to attend William and Mary College, from which he was graduated in 1762. He always set a high value upon his education, at one time declaring that if he were called upon to choose between the large estate left him by his father, and the education given to him, he would without hesitation choose the latter. He was fond of outdoor sports, an excellent horseman, and a skilled violinist, as well as a keen and eager student—a man of many accomplishments and of great personal charm.

After leaving college Jefferson studied law and in 1767 was admitted to the bar. But the law proved of only minor interest in the career of this many-sided man. He was also a statesman, diplomat, administrator, planter, and philosopher. Although he was successful in the legal profession, huskiness of voice rendered impossible long speeches, and he had no delight in the bitter personal clashes of the law courts. It has been said that in Virginia, during the Revolutionary War,

MONTICELLO AND THE JEFFERSON MEMORIAL



The picture of Jefferson's handsome home (above) reminds us that he was one of the fathers of American architecture. He wanted the young republic to reject British influence on its homes as well as its politics and return to classical models. When he began to build his home on a mountain top near Charlottesville, Va., he gave it the Italian name Monticello ("little mountain"), and designed it on the principles of Palladio, a great Italian architect. He made Monticello not only a model of beauty but

also a model of domestic convenience, with a multitude of ingenious devices to save labor. Jefferson also designed the Virginia state capitol and the buildings of the University of Virginia. Below is the shining marble Jefferson Memorial in Washington, D.C. This splendid colonnaded structure (completed 1942) was designed by John Russell Pope in the Graeco-Roman style that Jefferson admired. It is on the Tidal Basin, with the Washington Monument and the Lincoln Memorial.

"Washington was the sword of the rebellion, Patrick Henry its tongue, and Jefferson its pen."

Early in life Jefferson had been fired with the spirit of Liberty. He had stood in the hallway of the House of Burgesses (legislature) in 1765, when Patrick Henry uttered his famous words, "If this be treason, make the most of it!" He was naturally a bold and fearless thinker, and he had read the English and French political philosophers. He was elected to the House of Burgesses in 1769, and was a member of every succeeding assembly until he was sent to the Continental Congress in 1775. From the first he stood with the party of resistance against England. His views were set forth in a notable pamphlet entitled 'A Summary View of the Rights of America', a presentation which attracted widespread attention.

Jefferson was only 32 when he took his seat in the Continental Congress, but he at once became prominent. Re-appointed by Virginia in 1776, he won imperishable fame as draftsman of the Declaration of Independence (see Declaration of Independence). Soon afterwards he resigned his seat in the Continental Congress to enter the legislature of Virginia, which had now driven out its royal governor and adopted a state constitution, though of a rather conservative sort.

Jefferson hoped to carry through a revision of Virginia's antiquated laws so as to bring them into harmony with democratic principles. In this he was only partially successful, for the old planter element was still strong, and it was swayed by conservative and aristocratic ideas. It was ten years before some of Jefferson's reforms were adopted, but in the end "the impress of his mind was in every part" of the statute book of Virginia. He introduced and carried through measures which abolished the entail of land and the exclusive right of the first born to inherit (primogeniture); and with these two laws gone, the old aristocratic social system "crashed to pieces almost in a day." Another law disestablished the Episcopal church and secured religious liberty. He failed in the attempt to pass laws for a gradual abolition of slavery in Virginia, but he remained opposed to it until the end of his days. His comprehensive plan for a system of popular education, also, including district, grammar, and classical schools, was not put into operation until many years later. In his old age he was successful in establishing the University of Virginia, one of the first of the state universities which have meant so much for education.

From 1779 to 1781, during the last dark days of the Revolution, Jefferson was governor of Virginia. In 1780 the state was invaded by the British and he could do nothing for his fellow-citizens and barely escaped capture himself. The times called for a man of action and a warrior, and Jefferson was neither. After peace was signed he served again in Congress, and rendered two important services. He introduced

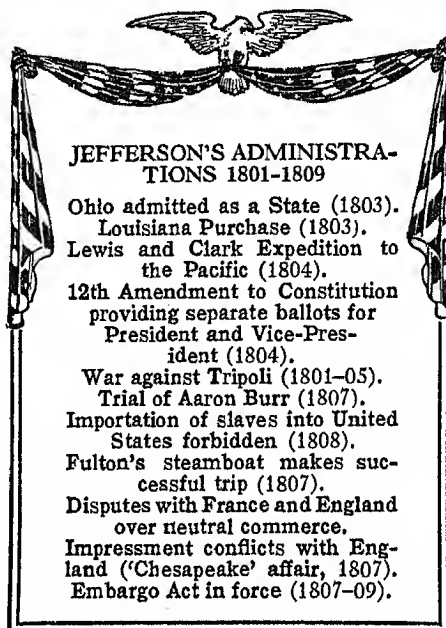
the decimal system of coinage (dollars, dimes, cents) in use today; and he prepared a plan for the government of the territory northwest of the Ohio River which provided for the prohibition of slavery in that territory after 1800. The substance of the provision was embodied in the later Ordinance of 1787.

In 1784 Jefferson was sent to France to assist Benjamin Franklin and John Adams in negotiating commercial treaties with foreign countries, and in the following year he succeeded Franklin as minister to France. He thus had no direct part in drawing up the Constitution of 1787. When the "new plan" was published he, like Patrick Henry and Richard Henry Lee, found much in it that seemed objectionable, but he trusted

to later amendments to remove what he feared were dangers to the liberties of the people.

Jefferson served as secretary of state under Washington from 1790 to 1793. Alexander Hamilton was secretary of the treasury, and his views and those of Jefferson were so opposed that they rarely agreed. Jefferson believed in "states' rights" and a "strict construction" of the Constitution which would limit the powers of the Federal government to those specifically granted. Hamilton, on the other hand, saw clearly the need of a strong central government, and favored a "loose construction" of the Constitution, which would permit of the rise of a strong national government (see Hamilton, Alexander). Differences fully as bitter developed over foreign affairs. Jefferson and the "Republicans" (Democratic-Republicans) were ardent supporters of the French Revolution and favored France as against England, while Hamilton and the "Federalists" held opposite views.

At the close of 1793 the differences became so acute that Jefferson resigned from Washington's cabinet. In the election of 1796 he was chosen vice-president, with the Federalist, John Adams, as president. The four years that followed were marked by the bitterest party struggle. Then, in the election of 1800, came a political revolution which swept the Federalists from power and brought the "Repub-



licans" (Democrats), under Jefferson's leadership, into complete control. Aaron Burr became vice-president, in spite of a Federalist intrigue to substitute him for Jefferson.

As president, Jefferson tried to put into practice his cherished ideas of democratic simplicity. He was more impressed, however, with the need of repealing various oppressive laws passed by the Federalists and his removals of Federal officeholders to make room for Republicans exposed him to the charge of introducing the "spoils system" into the government. The Federalist judges, however, could not be removed, and in Chief Justice Marshall President Adams had left behind him a staunch defender of the national interpretation of the Constitution (*see* Marshall, John). The finances were ably administered by Albert Gallatin, a naturalized Swiss, as secretary of the treasury.

The Splendid "Louisiana Purchase"

The crowning achievement of Jefferson's first administration was the purchase of Louisiana from France (*see* Louisiana Purchase). Following this, he sent out the Lewis and Clark expedition to explore the new territory and to establish the claim of the United States to the Oregon country. He also dispatched a naval expedition to the Mediterranean to crush the pirates of Tripoli in North Africa who were interfering with American commerce. Jefferson, however, believed that armies and navies were dangerous to the liberties of a free people, and reduced both these arms to the lowest point possible.

In general the four years of Jefferson's first administration were years of prosperity, and he was re-elected in 1804 by an overwhelming majority, with George Clinton of New York as vice-president. One of the important events of his second term was the trial and acquittal of former Vice-President Burr, who was accused of treasonable plottings in the western country (*see* Burr, Aaron). Another was the passage of a law forbidding the slave trade after Jan. 1, 1808. But overshadowing all else were the growing difficulties in foreign affairs which finally led to the second war with Great Britain (*see* War of 1812). As a defense against the aggressions which both England and France practiced against neutral shipping, Jefferson persuaded Congress to pass an Embargo Act (*see* Embargo Acts) forbidding American ships to leave the harbors. If this law could have been strictly enforced, it would have ruined American commerce much more completely than the attacks of England and France could possibly have done. As it was, it brought New England to open threats of secession, and during the last months of Jefferson's administration the embargo was repealed. Three days later Jefferson retired from office, making way for the successor whom he had himself preferred, James Madison, his secretary of state.

The remaining 16 years of his life were spent chiefly at his beautiful plantation home, Monticello, in Virginia. Jefferson had always regarded agricul-

ture as the best occupation for men and the foundation of all other wealth. He was a scientific farmer for his day, and was constantly endeavoring to improve methods and introduce new crops, for which he searched Europe. At the same time he kept in touch with public affairs through his numerous correspondents, and his personal influence was very great. As the "Sage of Monticello" he was still one of the most distinguished of Americans. People came from all parts of the country to visit him—"people of wealth, fashion, men in office, professional men, military and civil, lawyers, doctors, tourists, travelers, artists, strangers, and friends." His lavish hospitality, indeed, helped to bring him to financial ruin.

Jefferson died on July 4, 1826—on the same day as John Adams and just 50 years after the adoption of the Declaration of Independence. In accordance with his request this epitaph was inscribed on his monument: "Here was buried Thomas Jefferson, Author of the Declaration of American Independence, the Statute of Virginia for Religious Freedom, and Father of the University of Virginia." He was greater as a thinker than as a man of action. His mind flashed brilliantly from many facets, and he was ahead of his age in countless ideas. His warm-hearted political philosophy laid deep the foundations of United States democracy. Without Hamilton the new government might have lacked the force and vigor necessary to make it a success; without Jefferson it would have lacked that faith in average human nature which has made the United States the haven for the oppressed of the world.

JELLY-FISH. If you are a "landlubber" and don't know the animal life of the sea, you have a thousand surprises in store. For great numbers of quaint and beautiful and wonderful creatures are found only in the sea, forms of life so strange that you would think they must belong to another world. Great groups of animals, many thousands of kinds, are wholly marine, such as starfishes and corals, and many others. Among the strangest of these sea forms are the "jelly-fishes" or *medusae*, and their cousins, the corals and sea-anemones. With many others they belong to the great group of rather simple animals known as *Coelenterata*.

Jelly-fish! Almost all jelly, and not fish at all! There is no skeleton or any of the other things that make a creature a fish. But of jelly, more than nine-tenths of it! In some forms not much more than one per cent is really living matter.

A thousand kinds there are, varying in form and size and color. Even if you had a typical living specimen you would find it difficult to understand it fully, so different is it from the animals you usually see. A typical one may be umbrella-shaped, with few or many feelers or "tentacles," and sometimes simple eyes around the edge of the umbrella, and with the mouth and stomach in the position of the handle of the umbrella. Simple muscles on the under side contract the body much like the closing of an

umbrella, and cause the swimming of the animal, and also enable it to swim into deeper water during rough seas. With certain explosive cells in the tentacles, other small animals are paralyzed, and then drawn into the mouth by means of the tentacles. A network of nerves runs beneath the lining of the umbrella and coördinates the muscles as they perform simple actions such as swimming.

During most of their lives, the larger jelly-fish swim about freely. Many of them reproduce by the process shown in the picture.

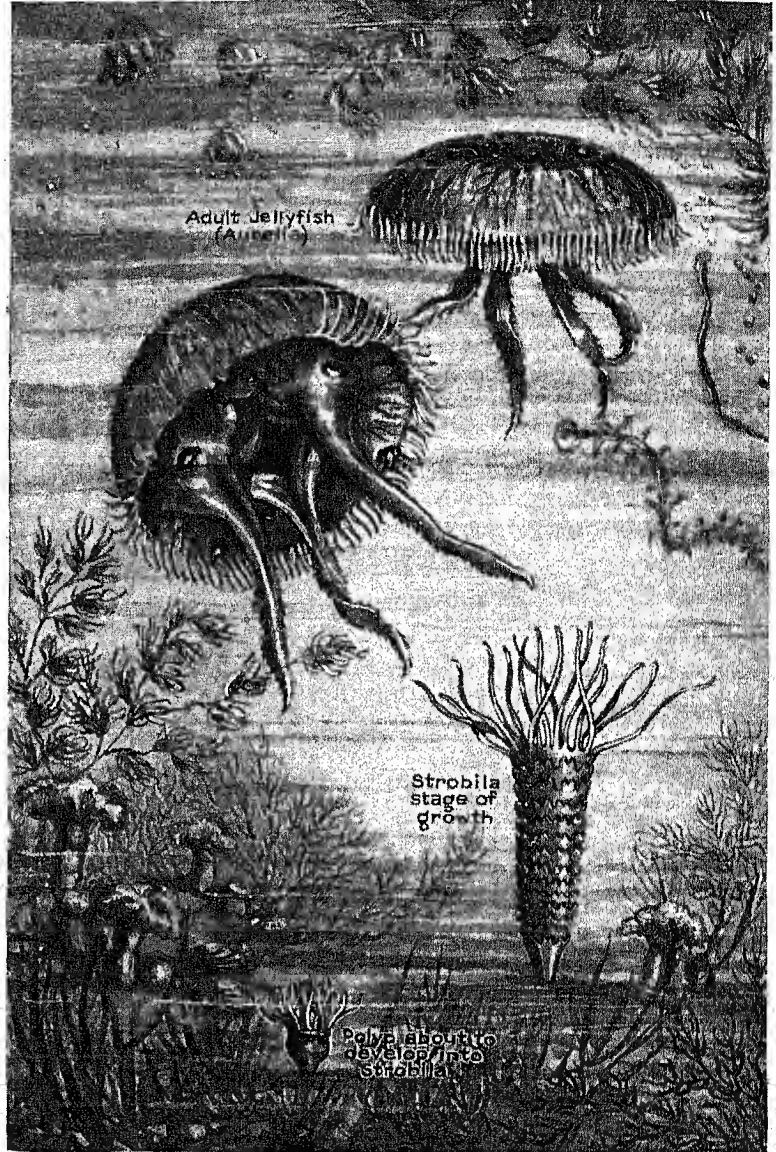
Some of the smaller jelly-fish spend most of their lives as attached polyps. A new individual is produced from a fertilized egg and swims about for a short time. Then it attaches itself to rocks or seaweed and develops an internal cavity, a mouth, and tentacles. From each polyp others develop as buds. Some of them remain attached to the parent, and form a colony; but others break away and become jelly-fish. The budding process, following reproduction by fertilized eggs, is called alternation of generations.

Some jelly-fishes are just visible to the eye, some are two feet or more in diameter; some are so delicate as to melt in your hand, some are almost as firm as gristle; some are as transparent as glass, some brown or pink or white or blue; some are egg- or ribbon-shaped; some are modified into queer floating creatures, as the "Portuguese-man-of-war." While most jelly-fishes live at or near the surface of the sea, a few live at the bottom where the water is a mile or more deep. Some are phosphorescent, and look like great balls of fire when struck. All are strange and most fascinating.

JERSEY CITY, N. J. Commercially and industrially Jersey City is a part of Greater New York, though political geography makes it a part of New Jersey. The city is the terminus of nine trunk-line railways which link it with the South and West. Four "tubes" or subways and the Holland Tunnel for motor vehicles, under the Hudson, as well as numerous ferries, connect it with New York City. Lying on New York Bay, at the center of the world's greatest port, the city has shipping interests that are prob-

ably second only to those of New York, but as it is not recognized officially as a separate port, there are no separate statistics. The manufactures are exceedingly varied, including electrical and scientific apparatus, railway locomotives and cars, lead pencils and

SEE WHAT JELLY-FISH HAVE TO GO THROUGH!



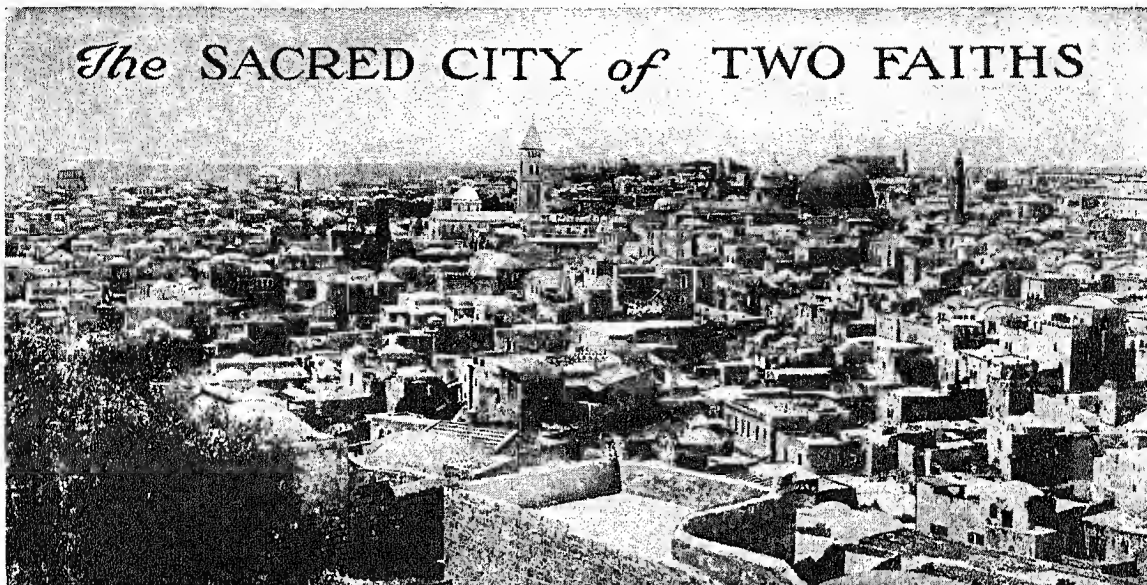
The business of becoming a full-grown jelly-fish is a complicated process. Here we see the life history of one of the commonest forms, the Aurelia. First, the egg swims around as though it intended to stay just as it is. But soon it becomes attached to the bottom and begins to grow like a plant. This is the "polyp" stage. Soon the top of the polyp, carrying the arms, moves up and another cup-shaped segment is formed, and then another and another until there are 13 in all. This is the "strobila" stage. Then the top segment breaks off and swims away, and in the course of time turns into a real jelly-fish, like the ones you see here. Meanwhile the second segment of the strobila grows tentacles and splits off, and so on until 13 new jelly-fish have appeared.

crucibles, jewelry and musical instruments, chemicals and patent medicines, paints and varnish. Its great slaughtering and meat-packing industries make it the meat depot of New York.

Jersey City has some notable public buildings and excellent schools. It boasts the magnificent Hudson Boulevard, 19 miles long and 100 feet wide, which extends along the ridge in the western part and gives an excellent view of the river and upper New York.

The first settlement was in 1630. Despite its strategic location, the site of the city, known as "Paulus Hook," was used only as farming land until the 19th century. Since 1913 the city has had the commission form of government. Population, 301,173.

The SACRED CITY of TWO FAITHS



Spread out before us is Jerusalem, the Holy City of both the Jewish and the Christian religions. What historic memories must crowd upon those who are fortunate enough to visit this hallowed spot!

JERUSALEM. "If I forget thee, O Jerusalem, let my right hand forget her cunning!" So sang the Hebrew psalmist as he thought with passionate devotion of the holy city from which he was exiled. In the Middle Ages the Crusaders, who had toiled the long weary way from their homes in Europe to redeem the city of Christ from Mohammedan rule, knelt in the dust and wept with joy as they beheld from afar the city of their dreams. Today, Jerusalem still draws hosts of pilgrims who come to kiss its crumbling ruins, to look upon the place of Christ's death and resurrection, and to approach with reverent awe its other holy places.

The city lies 2,500 feet above sea level in the mountain region of Palestine between the Mediterranean and the Dead Sea. Seen from the neighboring hills, it still appears as the Bible describes it, "beautiful for situation." Though deep ravines on three sides make it a natural fortress, Jerusalem, "city of peace," has suffered terrible sieges; and lack of an adequate water supply within its walls rendered it defenseless against prolonged attack. Not until 1936 was the water shortage remedied, with completion of a 40-mile pipe line from the headsprings of the Anja River. East and northeast is the Valley of Kedron, with the Mount of Olives beyond. On the west and to the south is the Valley of Hinnom, or Gehenna. This ravine was deemed accursed in ancient times, for here at one time human sacrifices were made to

the Phoenician god Moloeh, and later the bodies of criminals were cast out. For this reason the name Gehenna became synonymous with Hell, a place for torment after death. In ancient times another depression, the Valley of Tyropoeon, separated western Jerusalem, or the upper city, from the city of David (Zion) and Mount Moriah (the Temple Hill). But the rubbish that has been accumulating for centuries has almost filled up this ravine.

Ancient Walls and Holy Places

The walls surrounding Jerusalem have been many times destroyed and rebuilt. Those through which we enter the city today, by one of the eight gates, were built by Sultan Solyman the Magnificent in the 16th century. Portions of these, however, rest upon more ancient foundations.

Of the splendid Temple, which was the center of worship for all Israel, no part remains standing today. The "Wailing Wall," where Jews still gather every Friday to mourn and pray, was once supposed to be a part of the Temple erected by Solomon, but it is now thought to belong to later times. A Mohammedan place of worship, the Dome of the Rock, known also as the Mosque of Omar, now stands on the holy spot. Within its courtyard, in the center of a group of buildings, is the mosque itself, a fairy-like edifice, exquisitely wrought of marble and colored tiles.

The place in Jerusalem most visited by Christian pilgrims is the Church of the Holy Sepulcher, built

over the supposed tomb of Jesus. No man can point with certainty either to Golgotha, the place of the crucifixion, or to the place of Christ's burial; but for ages men have made long pilgrimages to visit these "holy sites," have suffered and struggled and died for possession of them, so we cannot look without feelings of awe and reverence upon the reputed spots.

Franciscan monks tend with care the place at the foot of the Mount of Olives which is believed to be the Garden of Gethsemane. Here several ancient olive trees are pointed out as the very ones in whose shadow Jesus knelt and prayed in anguish. The Mount of Olives, associated with so many scenes of religious history, rises above the garden to overlook the whole city.

The streets of old Jerusalem are narrow and crooked, but in the suburbs that have grown up outside the walls in recent years, there are wide, tree-lined streets, beautiful gardens, and modern houses. Here more than two-thirds of the present inhabitants of Jerusalem live and work. In the city, Moslems, Armenians, Christians, and Jews occupy separate quarters. Jews now form more than half the

The history of Jerusalem goes back to the 14th century before Christ, when, according to the Tel-el-Amarna letters, it was occupied by the Egyptians.

WAILING PLACE OF THE JEWS IN JERUSALEM



"If I forget thee, O Jerusalem, let my right hand forget her cunning!" So sang the Hebrew psalmist in exile from the Holy City of his faith, and the Jews in Jerusalem itself still come to this wailing place every Friday to mourn and pray. Those Hebrew carvings on the wall are prayers of pilgrims.

At the time of the Israelites' entrance into Palestine, it was held by the Jebusites, a Canaanite tribe. David conquered the city and made it the capital of his kingdom. It reached its greatest splendor under Solomon. After the division of the kingdom, it remained the capital of Judah until destroyed by the Romans under Titus in 70 A.D.

About 130 A.D. the Emperor Hadrian rebuilt the city and named it Aelia Capitolina. Its history from this time is obscure until the 4th century, when Constantine the Great after his conversion to Christianity gave orders for the recovery of the holy places and the erection of two magnificent churches. In 637 Jerusalem was captured by the Moslems. Except for brief intervals, as when the first Crusade set up an ill-fated Christian kingdom (see Crusades), it remained in the hands of Mohammedans for more than seven centuries, the chief change being that from Arab to Turkish sovereignty. It was a part of the Turkish

Empire from 1517 until Dec. 9, 1917, when it was captured from the Turks by British forces under General Allenby. Later it was made the capital of the British mandated territory of Palestine. The population is about 135,000.

IN THE GARDEN OF GETHSEMANE



This is the Garden of Gethsemane at the base of the Mount of Olives as it looks today. The monk from the Franciscan monastery which the walls of the Garden enclose is standing under an olive tree which, according to tradition, was standing at the time of Christ's "agony in the garden."

population, as a result of the Zionist movement, which has brought them back in large numbers to their sacred city. On Mt. Scopus, near the Mount of Olives, is the Hebrew University, which was opened in 1925 as a center of Jewish culture.

"SALVATOR MUNDI"—*The Story of Jesus*



"And when they had fulfilled the days, as they returned, the child Jesus tarried behind in Jerusalem: and Joseph and his mother knew not of it. And it came to pass . . . that after three days they found him in the Temple in the midst of the Doctors, both hearing them and asking them questions. And all that heard him were astonished at his understanding and answers."

This passage from the New Testament is here illustrated by Hofmann's famous painting.

JESUS CHRIST. Nearly all that we know about the life of the founder of Christianity is contained in the four Gospels of the New Testament. These accounts were written from 60 to 100 or more years after the birth of Christ, by men of different temperaments. So they naturally differ in some details, but they agree in all essentials. But aside from mere mention by two Roman historians, in works written within a century after his death, the secular historians of his time said nothing about this Man who has had such a profound influence on the life and thought of the world.

Although in most countries today time is reckoned from the birth of the founder of Christianity, a mistake was early made in regard to the date of this momentous event. We have no record to show the exact date of Jesus' birth, but we do know that he must have been born four or five, or possibly even six years before the date which was centuries later adopted as the beginning of the Christian era.

Jesus was born in Bethlehem of Judea, about six miles from Jerusalem. To his mother Mary an angel foretold that she, a virgin, should bring forth a child who should be the Son of God. When her time was

fulfilled Mary and her husband Joseph, a poor carpenter from Nazareth in the northern province of Galilee, had come to Bethlehem to be taxed, in accordance with the law of the Romans, who at that time exercised control over the land. Because there was no room for them in the inn they were forced to lodge in a cave hollowed out in the hillside and used as a stable for cattle. Yet the babe, born here in poverty, was descended, it was said, from David, the great king of Israel, and his coming was attended by signs and wonders. Guided by the songs of angels, shepherds who had been watching their flocks through the night came to this lowly spot and knelt in adoration before the cradle of the holy child.

The Coming of the Wise Men

Soon afterwards wise men, or "Magi" as they were called, came from the East saying, "Where is he that is born King of the Jews? for we have seen his star in the East, and are come to worship him." Herod, who was king in Jerusalem, upon hearing these words, was alarmed for the safety of his own throne, and secretly planned to kill the child. It is even said that he ordered all children two years old or under

to be slain. But Joseph, having been warned by an angel in a dream, fled with Mary and the child to Egypt, where they lived until the cruel Herod died. Then they returned and took up their abode in Nazareth, where Jesus passed his boyhood. Of these years, the Bible tells us only one incident. When he was 12 years old, Jesus went with his parents to Jerusalem, as was the custom, to celebrate the Passover. Returning home, his parents had traveled a long distance when they noticed that Jesus was not with them. Anxiously returning to the Temple, they found him sitting in the midst of the doctors, who were astonished by his understanding and wisdom.

From boyhood to manhood Jesus grew in strength and wisdom. When he was about 30 years of age, he was ready for his great mission. A short time before, a prophet had appeared, announcing the near approach of the long-awaited Messiah or Christ, and calling to the people to repent and prepare for the kingdom of God. From the fact that he baptized his followers in the River Jordan, he is known as John the Baptist. Jesus himself came for baptism, and John recognized in him the one mightier than himself, whose coming he foretold.

Preparation for His Great Work

In order to prepare himself for the great work that now lay before him, Jesus went alone into the wilderness, and for 40 days and 40 nights he fasted and prayed, struggling with temptation. After his return there gathered about him a little group of disciples who recognized him as the Messiah. Gradually the numbers of these followers increased, and from them were chosen the 12 apostles who were especially appointed to spread his message (*see* Apostles).

Jesus showed miraculous powers in turning water into wine at the wedding at Cana, in healing the sick, in feeding 5,000 with five loaves and two fishes, and in performing many other wonders. Wherever he went he sought out the lowly, associating with publicans (the despised tax-gatherers), with the poor and the maimed, even sinners. To all who were suffering he brought a message of comfort: "Come unto me, all ye that labour and are heavy laden, and I will give you rest." Love was the keynote of his preaching: "Thou shalt love the Lord thy God with all thy heart, and with all thy soul, and with all thy mind, and with all thy strength; this is the first commandment. And the second is like, namely this, Thou shalt love thy neighbour as thyself." He even taught, "Love your enemies, do good to them which hate you." He bade men follow the law of Moses and the words of the prophets. "Think not I come to destroy the law, or the prophets," he said; "I am not come to destroy, but to fulfil." But he saw that many of the Pharisees, who boasted of their strict adherence to the Jewish law, followed only the letter of the commandments, and forgot the spirit. For this he did not hesitate to denounce them; while they in turn looked upon him as a revolutionary, accused him of breaking the Sabbath because he

healed the sick on the day of rest, and regarded as blasphemy his claim to be the Son of God.

When Jesus at last went to Jerusalem he had long known that he must suffer and die. On Passover Eve, he ate his last supper with his 12 disciples and retired for prayer to the Garden of Gethsemane. There he was betrayed by Judas Iscariot, one of the Twelve. He was arrested, and brought before the Sanhedrin, the Jewish council of priests and elders. After a hasty trial, they pronounced him guilty of death for blasphemy; but as they had no authority to pass the death sentence, they delivered him up to Pontius Pilate, the Roman governor. Pilate, after washing his hands to show that he was innocent of the blood of the prisoner, yielded to the demands of the multitude and gave him up to be crucified. With a crown of thorns upon his head and arrayed in a purple robe, which the soldiers placed upon him in mockery, Jesus was led to Golgotha, the place of execution. There, with a criminal on either side of him suffering the same punishment, he died upon the cross, crying in his last agony, "My God, why hast thou forsaken me?"

Jesus' body was taken from the cross and placed in a tomb by Joseph of Arimathea and Nicodemus. Three days later, on the first day of the week, when some of the women came with spices to embalm the body, they found the tomb empty. An angel who kept watch told them that Christ had arisen from the dead. The risen Christ appeared first to Mary Magdalene, the once sinful woman from whom Jesus had cast out seven devils, and who had become one of the most devoted of his followers; and then to others who had been close to him. He spent 40 days on earth after his resurrection, and then from the midst of his disciples he was taken up to heaven. He left no writings. But from recollections of his teachings his followers later put together the record of his ministry, as we have it in the New Testament, and with it there slowly took shape the doctrine and organization of the Christian church, which has come to be one of the ruling forces in the world's history. (*See* Church, Christian.)

JETTY. Embankments or piers built in rivers and harbors to increase the depth of the water by narrowing the channel and thus increasing the scouring action of the current are called jetties. They are particularly valuable where a river empties into a sea which is more or less tideless. In such cases the sediment brought down by the stream is continually being deposited at the mouth, forming a delta, because there is little or no scouring action due to the flow and ebb of the tide. The jetties at the mouth of the Danube, constructed between 1858 and 1868, increased the depth of water from 9½ feet to 22 feet. The Mississippi jetties, built by James B. Eads in 1875-79, are notable among engineering achievements. They were made by sinking mattresses of interwoven osiers, and covering these with stones and concrete, forming broad and strong containing walls.

The CHILDREN of ISRAEL—the "Eternal People"



Moses Bringing Down the Tablets of the Ten Commandments from Mount Sinai

JEW S. A people scattered over the length and breadth of the earth for almost 19 centuries, and still remaining a distinct race, though mingling with the people of many lands, the Jews have well been called "the eternal people."

We cannot speak of the Jews merely as an ancient people, as we do of the ancient Assyrians and Babylonians, for they are still a living race, and a vital force in the world today. Though they number only 16 or 17 million—slightly less than 1 per cent of the total population of the world—we cannot mention any important field of human activity without finding many Jews among the great names.

The same intensity of character that made Israel a great nation in ancient times has given the Jews of today distinction in every department of life. For in mental and moral traits, and even in form and feature, the Jew of today is much the same as his forefathers of the days of Solomon and David.

No other people has preserved its racial character almost unmodified for so long a time; no race has

endured greater sufferings and misfortunes; and no race, in proportion to its size, can boast of more glorious achievements or more lasting culture.

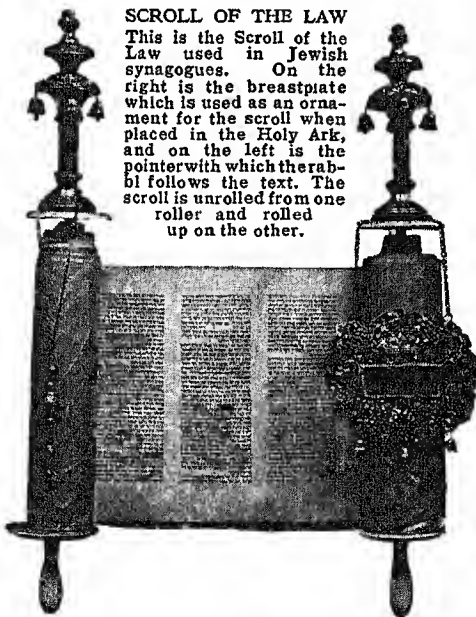
The history of the Jews begins in a far-distant

past, when this people were wandering Semitic tribes of the Arabian desert, slowly drifting into Palestine (see Palestine). According to the Bible, the great forefather of the race was Abraham, who about 2000 B.C. led his people forth from Ur of the Chaldees at the divine call, to found a nation dedicated to the service of the one God (see Abraham). Because he came from beyond the Euphrates River, Abraham was called "the Hebrew" (from a word meaning to "cross over") and this name was given to his descendants. Isaac, who succeeded Abraham as patriarch of the tribe, had twin sons, Esau and Jacob. Jacob, whose name was changed to Israel, gained the leadership. He was followed by his 12

sons, who became the heads of the 12 tribes, known as the Israelites. Esau settled in a land near Canaan, and founded a people later known as Edomites.

SCROLL OF THE LAW

This is the Scroll of the Law used in Jewish synagogues. On the right is the breastplate which is used as an ornament for the scroll when placed in the Holy Ark, and on the left is the pointer with which the rabbi follows the text. The scroll is unrolled from one roller and rolled up on the other.



Jacob's fondness for his son Joseph aroused the jealousy of the other brothers and they secretly sold him as a slave to some merchants on their way to Egypt. But Joseph through his honesty and wisdom gained the favor of the Pharaoh, or ruler, and rose to the position of prime minister of Egypt. After a time, because of famine in Palestine, Jacob and his sons came to Egypt to buy grain. Through Joseph's influence they and their families were given land, and there they remained for generations, enjoying prosperity and greatly increasing in numbers. But in after years, according to the Bible account, the Egyptians became jealous of the Israelites and made them slaves. From this oppression they were delivered by Moses and led back to Palestine, or Canaan, "the Promised Land," which was then inhabited by a highly civilized Semitic people called the Canaanites. Before this time the Israelites had been a wandering shepherd people; now, under the laws established by Moses and the influence of Canaanite civilization, they gradually grew into a strong nation (see Moses).

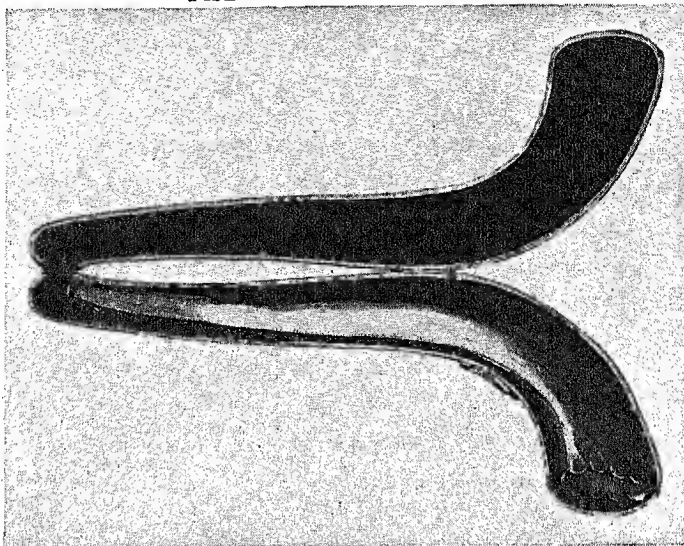
The Jews in the Land of Canaan

Moses was succeeded by Joshua, who led the Israelites across the Jordan River, taking possession of the land of the Canaanites and dividing it among the tribes. Levi, the priestly tribe (whose members were called Levites), was given no land, for its members were to dwell among the other tribes as religious leaders. Joshua won many victories against the Canaanites, but the Israelites were still sorely harassed by them and other warlike tribes, especially the Moabites, the Ammonites, and the Philistines (see Philistines).

To lead the people during these troublous times, officers known as "Judges" were appointed. Among the most famous of these were the warrior Gideon, the woman-judge Deborah, and Samson, who performed marvelous feats of strength. In the time of the prophet Samuel, the people decided that they must have a stronger form of government and demanded a king. For this office, Saul was chosen. He united the tribes of Israel into a strong kingdom and won many brilliant victories, but he and his son Jonathan both fell in battle against the Philistines.

David was then proclaimed king and peace was at length established throughout the land (see David). Under his son Solomon the kingdom reached its

THE SACRED TRUMPET



This ram's horn is blown in connection with the religious ceremonies of the Jewish New Year festival.

greatest prosperity and glory (see Solomon, King of Israel). When Solomon's son Rehoboam ascended the throne the ten northern tribes revolted and made Jeroboam king. Only Rehoboam's own tribe of Judah, together with the little tribe of Benjamin, remained faithful to the house of David. From that time on (the 10th century B.C.) the land of the Hebrews was divided into two kingdoms—the northern one being

known as Israel, and the southern as Judah.

Feeling was bitter between the two kingdoms and border wars were frequent. Israel was rich and prosperous; its land was fertile, and its people dwelt in towns. But the land of Judah was stony and sterile; Jerusalem was its only large town, and most of its people still clung to their old shepherd ways of life. Religious differences also arose because the town-dwellers of the north were easily led to adopt the heathen worship of the Canaanites, just as they borrowed other elements of Canaanite civilization.

National Decay and the Assyrian Conquest

Jeroboam forbade his people to worship at the temple in Jerusalem, and introduced idolatrous worship. Under his successors the country went from bad to worse. Finally in 722 B.C. the Assyrians captured Samaria, the capital, carried the mass of the people into captivity, and put an end to the kingdom of Israel. The ten tribes were thus lost to history. Their place was taken by Assyrian colonists, who mingling and intermarrying with such Israelites as were left, formed the people known as the Samaritans.

The little kingdom of Judah endured for more than a hundred years longer, though its position between the powerful states of Egypt and Assyria exposed it to repeated invasions. For the most part it remained faithful to the ancient religion. Under King Hezekiah, Jerusalem was strengthened and an attack of the Assyrian army under Sennacherib was driven back. King Josiah was slain in a battle with the Egyptians, and Judah was forced to pay tribute to Egypt. The weakened kingdom finally fell a prey to the Chaldeans, who had become the great world

power. Jerusalem was captured by Nebuehadnezzar in 586 B.C., most of the people were carried away into exile in Babylon, and the once flourishing kingdom of Judah became a wilderness, as the prophets had foretold (see Prophets).

After about 70 years, the Chaldean Empire was overthrown by the Persian king Cyrus, who permitted the Jews who so desired to return to Jerusalem and rebuild the temple. Later Ezra the Scribe led another band back to Jerusalem, and brought about a great religious awakening. A few years later Nehemiah, a Jew, was appointed governor of Judea, and in this position was able to do much for his people. During this period the writings contained in the Hebrew Bible were collected and arranged, and the religion of Judaism came to full flower.

After the conquests of Alexander and his death (323 B.C.) the Ptolemies of Egypt ruled Judea for about a hundred years and then it fell into the hands of Syria. The Syrian king Antiochus Epiphanes outraged the feelings of the Jews by setting up idols and ordering the people to worship them. The aged priest Mattathias raised the flag of revolt, and under the leadership of his five sons, known as the Maccabees, the Jews defeated the Syrian army, and finally won their independence (130 B.C.).

Before long, however, the people became divided into parties, or sects, such as the Pharisees and the Sadducees. A dispute arose between two claimants to the throne, and Rome, with whom an alliance had been formed, was called upon to act as arbiter. The Roman general Pompey took advantage of the situation to make himself master of Jerusalem and force the Jews to pay tribute. When Julius Caesar came into power he placed a foreign ruler, Antipater the Idumean, over Judea. Antipater's son and grandson ruled from 37 B.C. to 39 A.D. (see Herod). Under the Roman governors who followed there were frequent insurrections, culminating in the great Jewish war of 66 A.D. After a long siege the Roman general Titus, afterwards emperor, took Jerusalem in 70 A.D., burned the temple, massacred thousands of Jews, and captured thousands of others to be sold as slaves.

The Jews Migrate Throughout the World

During the period of Roman domination, many Jews left Palestine for Rome and Alexandria; after the destruction of the temple many others settled along the African and European coasts of the Mediterranean. Later they spread into central and western Europe and Spain, reaching England shortly after the Norman Conquest. Others penetrated eastward into Asia.

During the Middle Ages the scattered communities of Jews in Europe opened channels of trade and communication among previously isolated countries. Feudal lords welcomed them for their knowledge of trade and science, and they received special privileges, especially at the court of Charlemagne and among the Moors in Spain, as bankers, physicians, and merchants.

But with the increase of religious intolerance during the Crusades, the Jews were expelled from England

in 1290, from France in 1306, and from Spain in 1492. They were not permitted to return for many centuries. In other European countries they were forced to live in crowded quarters called *ghettos*, and to wear distinguishing clothes or badges. They were forbidden to own land or join the guilds; only trading and money lending remained open to them. Deprived of civil rights and protection, they lived, especially in Russia and Poland, in constant fear of *pogroms*, or outbursts of mob violence, in which men, women, and children were massacred. Thus for centuries Jews lived as wretched outcasts.

Yet in times of privilege and of terror alike they clung to their religious and communal unity. Their rabbis, or spiritual leaders, led in the building of places of worship called *synagogues*, and in the establishment of schools in which the Hebrew language and literature were kept alive. (See Hebrew Language and Literature.) The old dietary laws of Moses were retained; no pork was eaten, meat and dairy products were not eaten at the same meal, and all animals were slaughtered in a clean and humane fashion. Permitted food was called *kosher* ("ritually clean"). Rosh Hashanah (New Year's Day), Yom Kippur (The Day of Atonement), and other old holidays were still kept.

Jewish Emancipation in the Age of Reason

The social reforms which accompanied the rise of rationalism and the French Revolution in the 18th century included Jewish emancipation. France adopted the tolerant attitude which had long prevailed in the Netherlands; and thereafter restrictions were removed by one country after another.

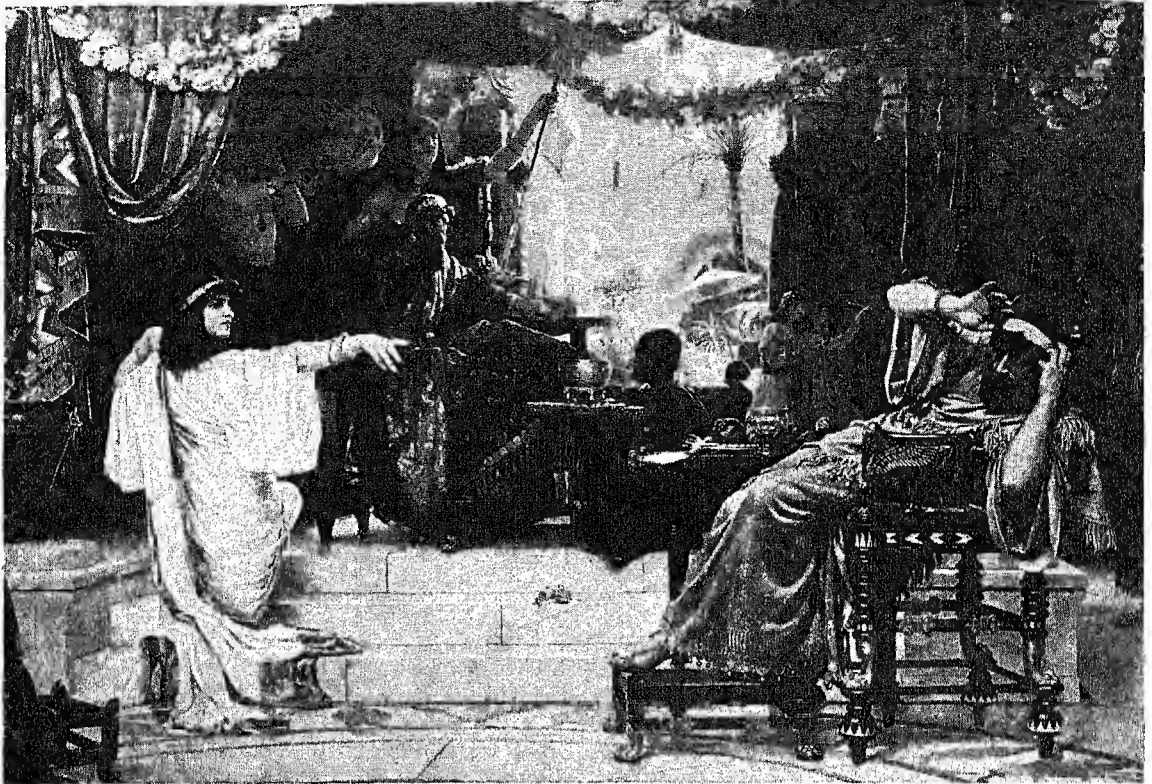
Just as the first Moses led the Jews out of Egypt, and the great Moses Maimonides (1135-1264) led them to take an important part in Mohammedan civilization, so a third leader of the same name, Moses Mendelssohn (1729-86), led the renewed entrance of Jews into the life and culture of the Western world. He was the first leader of *reformed* Judaism, which split off from the older *orthodox*, or *conservative*, Judaism. He proposed to subordinate the minor traditions of the Jews to the customs of the people among whom they lived; and to emphasize instead the principles of monotheism, virtuous living, tolerance, and peace as the true meaning of Judaism.

Since Mendelssohn's time, Jews have again contributed much to human progress in such widely differing fields as medicine, law, and music. Jews have won Nobel prizes in science and literature; England and France have had Jewish prime ministers. In the United States, where about a quarter of all the world's Jews now live, Jews have been governors, justices of the Supreme Court, ambassadors, and members of the president's cabinet. Jewish philosophers and psychologists have contributed to man's understanding of himself and his world. Jews have added richly to the arts, especially music.

After the First World War

In several countries Jews won new liberties after the end of the first World War. Treaties guaran-

THE TRIUMPH OF A GREAT JEWISH HEROINE



The story of how Esther, wife of Ahasuerus, king of Persia, saved her people from the cruelty of Haman, the king's chief minister, is a favorite Jewish tradition. Here we see the moment when Esther denounces Haman at the royal banquet, and exposes his plot. The next day Haman was hanged. The Jewish Feast of Purim commemorates the story to this day.

teed by the League of Nations gave them equality before the law and the right to maintain their own institutions. The more than 7 million Jews of Poland and Russia were liberated from the persecution that had continued until the fall of the czars. In Soviet Russia, discrimination against Jews became illegal, and a semi-independent Jewish republic was established at Birobidjan in Siberia.

But in the 1830's a new wave of anti-Semitism (antagonism to Jews) swept certain countries. In Poland there were Jewish riots in 1931. In Germany, systematic persecution of Jews as an avowed national policy began in 1933 when the Nazi party came to power (see Germany; Hitler, Adolf). Declaring that Jews were "a race inferior to Aryans," the government enacted a series of restrictive laws designed to drive every Jew out of Germany. Jews were deprived of citizenship, and were barred from nearly every professional and commercial occupation. They were compelled to sell their businesses for little or nothing; they were excluded from schools and places of recreation; and those leaving the country were allowed to take almost no property with them. Organized pogroms looted Jewish stores, destroyed synagogues, and maltreated individuals. Similar treatment was applied to Jews in Austria and Czechoslovakia when those

countries were seized by Germany and its neighbors. Italy, Hungary, and Rumania followed Germany's example in passing anti-Jewish legislation.

With one country after another seeking to drive its Jews into exile, mass migration became a world problem. Relatively few of these almost penniless refugees could find new homes in other countries of Europe or the Americas, because of the strict immigration laws which prevailed almost everywhere. At the suggestion of the United States, an Inter-governmental Committee was formed in 1938 to try to find havens for German refugees and to induce Germany to grant "conditions of orderly emigration."

The Zionist Movement

For nearly two decades, the chief Jewish refuge was Palestine, where a world-wide movement called *Zionism* has been rebuilding a Jewish homeland. Here a few Jews settled in the 19th century with the help of the banking house of the Rothschilds. In 1917 England promised by the "Balfour Declaration" to open Palestine for Jewish settlement, under British mandate. This was in part a reward for the wartime loyalty of English Jews, especially Chaim Weizmann, inventor of anti-Zeppelin bullets and the leader of the Zionist movement. In a little over 20 years, nearly 300,000 Jews entered Palestine. But in 1939 the mounting hostility of the native Arabs forced England to announce that Jewish immigration would be reduced sharply for five years and then stopped, unless the Arabs agreed to permit renewal. (See Palestine.)

SAINT JOAN OF ARC, the Maid who Saved France

*How the Gentle Country Girl was Led by Visions to Take Up the Sword for France
—Her Remarkable Success in the Field and Her Cruel Death
at the Hands of the Enemy*

JOAN OF ARC (1412-1431). In all history there is no story more romantic, or figure more noble and sweet, than that of Joan of Arc—Jeanne d'Arc

(zhān dārk), as the French call her—the hero maid who saved France from conquest in the first half of the 15th century. Her home was at Domremy, in the valley of the river Meuse in northeastern France; and her father, Jacques d'Arc, was a well-to-do peasant proprietor, owning a farm on the outskirts of the village. His daughter never worked in the fields, but helped her mother with the spinning, weaving, and other household duties. There were playtimes, too, for the French believe in innocent social pleasure, and energetic, good-tempered, kindhearted Jeanne was a general favorite in the village. But often her heart was troubled by what she heard of the condition of her beloved land. For many long years it had been wasted with war, and now the whole northern half was in the hands of the English and their ally, the Duke of Burgundy.

Its young prince, Charles VII—called the *Dauphin* because he had not yet been crowned king at Reims—was without money, armies, or com-

petent generals, and expected shortly to lose that part of France which still remained in his hands.

So, as Jeanne grew to be 13, when her girl friends

were beginning to think of lovers and marriage, she became devoutly religious. Loving quiet and solitude for holy thoughts, she often took the dog and watched her father's little flock of sheep, while she worked an altar cloth with the exquisite embroidery which afterwards occupied dark days in prison. On the breezy hillside, in the orchard, and as she knelt before an image of the Virgin in the village church, Jeanne began to hear heavenly voices and to see visions—of Saints Margaret and Catherine, and of the angel Michael, patron saint of soldiers. Their message was that she should go to the Dauphin, lead his troops to victory, and free France of the invaders. Her sorrowful family and the village priest tried to dissuade her, thinking her distracted; but she was determined to obey her "voices."

And such is the power of conse-

cration that she overcame the opposition of officials, bishops, and nobles, reached the Dauphin himself and won his belief in her mission.

JOAN RECEIVING THE SWORD OF ST. MICHAEL



This picture, from a French painting, shows Joan of Arc about to receive the sword from the Archangel Michael, in obedience to the message that she should lead the French troops to victory and free France of its invaders.

Now, clad in the shining armor of the Middle Ages, Jeanne went forth, mounted on an armored horse, bearing the sword which Charles Martel was said to have used against the infidel Saracens, and with the golden-lilied banner of France waving above her, she led an enthusiastic army to the relief of the walled city of Orleans, which the English at that time were besieging. Cutting boldly through the enemy, she entered the city. In four days of masterly sallies and attacks she sent the enemy flying. This was in May 1429, when she was not yet 17. In July Jeanne was able to conduct the Dauphin in triumph to Reims Cathedral, for coronation at the altar where the kings of France were always crowned.

Jeanne now regarded her mission as finished, and begged permission to return to her home. She declared her unsuitness to remain at the head of the army, since her heavenly "voices" had deserted her. The king however persuaded her to remain, and she marched to drive away the Burgundians who were besieging Compiègne. Here she was defeated, taken prisoner, and sold as a prize of war to the English. For months she was kept in a gloomy prison in the Norman city of Rouen, on the Seine, and was subjected to shameful indignities and a long trial before an ecclesiastical court. Abandoned to her fate by the ungrateful king and courtiers, she defended herself in her trial with great skill and courage. In the end she was convicted of witchcraft and heresy, and was burned at the stake in May 1431. An Englishman who stood by, impressed by her bravery, exclaimed, "We are lost, for we have burned a saint." A quarter of a century later Jeanne was declared innocent by the Pope, and on May 16, 1920, she was formally enrolled as a saint of the Catholic church. The immortal deeds and piteous death of "the Maid of Orleans" have inspired sculptors, painters, and poets for five centuries, while to France she is a national glory.

JOB. The most sublime treatment of the great mystery of human suffering is given in the Book of Job in the Bible. The hero of this dramatic poem is a wealthy chieftain of the land of Uz, somewhere between Palestine and the Euphrates, who is noted as a godfearing and upright man. But to test whether his righteousness will remain strong in suffering as in prosperity, God allows Satan to afflict Job with terrible misfortunes—the loss of his children, the loss of his property, and the attack of a loathsome disease.

When Job cries out in his great anguish, his friends come to him and tell him that all this suffering has come upon him through sin. But Job refuses to believe that his suffering is punishment for wrong-doing; he cries out to God for some other explanation. Filled with pain and doubt and discouragement as Job is, he still has not lost his faith in God. "I know that my Redeemer liveth," he says; and at last God, speaking out of the whirlwind, answers him. Job, humbled by this vision of God's power, bows in submission, realizing that the great mysteries of life are beyond man's understanding.

The Book of Job is regarded by scholars as among the latest Old Testament books, having been written about the 4th or 5th century B.C. The character of Job is probably a creation of the unknown author, rather than a real person, though there may have been some foundation in history. The book ranks with 'Hamlet' and 'Faust' as among the greatest poems dealing with man's spiritual history.

JOFFRE (*zhô'fr'*), **JOSEPH JACQUES CÉSAIRE** (1852-1931). "The Victor of the Marne,"

who halted the overwhelming rush of the Germans in 1914 and saved Paris and France, rose from the humblest circumstances to an imperishable place in history. His father was a maker of wine casks in the extreme southern part of France. The boy was so little interested in this kind of work that his father once declared, "If our Joseph amounts to anything it will be at his books, and not at the cooper's trade." So the future Marshal of France was sent to the famous École Polytechnique in Paris, where he prepared himself for a military career.

Before the young man had finished his education he was called to arms in the Franco-Prussian War of 1870-71. At the end of the disastrous siege of Paris he saw the victorious Germans march into his beloved city. He never forgot that scene, and he spent the next 40 years in making himself and France ready, should the Prussian foe strike again. Joffre completed his military training and saw many years of service in the French colonies in Africa and Asia. He superintended the building of defenses at many important points, and thus had an extended experience in military affairs. This had raised him to the position of chief-of-staff of the French army, when the World War broke out in 1914.

Joffre was at once made commander of all the French forces on the Western front, and held this

A SAD MEMORIAL OF JOAN



In this grim tower in Rouen, Joan of Arc was imprisoned and threatened with torture. It is all that remains of a great castle built by Philip Augustus in the 13th century. The tower now contains relics of Saint Joan.

position for two years. In the face of the powerful and crushing onslaught of the German army through Belgium, he ordered his troops to retire mile after mile into France. Many feared that the boast of the Germans to "take Christmas dinner in Paris" would be realized. But Joffre was calm. "I mean," he declared, "to deliver the big battle in the most favorable conditions, at my own time, and on the ground I have chosen."

After five weeks of wearying and discouraging retreat, the clarion call went forth (Sept. 6, 1914): "Soldiers, we are attacking. Advance as long as you can. When you can no longer advance, hold your position. When you can no longer hold it, die!" Every man responded to this call. The result was the glorious victory on the Marne River, and all France acclaimed "Papa" Joffre as the savior of France. When he visited the United States as a member of the French High Commission shortly after America entered the war, the American people also were aflame with enthusiasm for his heroic services and the simplicity and nobility of his character. Despite all his honors and triumphs, he remained the simple big-hearted man who thought only of his country and her need.

For Joffre's invaluable services, his country conferred upon him the title of marshal, the highest military honor in France, and decorated him with the grand cross of the Legion of Honor. These honors he bore quietly and modestly, saying: "I am a citizen of the Republic, nothing more." To have served his country faithfully and well was his proudest distinction. The affectionate nickname "Papa," which his soldiers bestowed on him, shows how greatly he endeared himself by his democratic ways and his unfailing care for their comfort and safety.

Joffre's removal from the active supreme command in December 1916 followed French reverses at Verdun. He became technical adviser to the government but retained the title commander-in-chief until he was made marshal two weeks later.

JOHANNESBURG, SOUTH AFRICA. Ringed about by the little circle of mountains called the Witwatersrand, which produces one-half

of the world's yield of gold each year, Johannesburg is a city literally "born with a gold spoon in its mouth." For 50 miles around the city the bare, open, and rather desolate rolling plateau is dotted with the tall chimneys of "workings" and the barracks, as alike as peas in a pod, in which the native laborers live during their stay in this greatest mining camp of the world. The ears of the city itself are assailed by the frightful clamor of the stamp-mills all day long and its eyes sometimes smart with the fine white choking dust which is loosed in the crushing of the ore.

Johannesburg is a fair counterpart of almost any large American mining town. It has broad straight streets, and many handsome edifices which house mining offices, the stock exchange, churches, schools, a university, and clubs. But it is not a "boom town"; it is a city founded upon a rock. Mining engineers have determined the existence

of a gold "reef" 61 miles long and apparently limited in depth only by man's ability to undertake mining operations in the deepest levels.

Founded late in 1886, following the discovery of the Rand gold reef in 1885, Johannesburg has grown with spectacular speed. At first a part of the independent Boer republic of the Transvaal, after the Boer War (1899-1902) it became a part of the Union of South Africa, under the British flag. Its population of about 520,000 makes it the largest city in South Africa. More than half are whites.

JOHN, KING OF ENGLAND (1167-1216). Vicious, shameless, ungrateful, King John holds the title of the worst king that ever ruled England. Yet the very excesses of his reign proved in the long run a blessing to the nation, by provoking such violent opposition that his subjects rose against him and forced him to put his seal to the document which became the bulwark of English liberty, Magna Carta.

"PAPA" JOFFRE, THE HERO OF THE MARNE



This is the great simple-hearted citizen of France whose patience, courage, and skill achieved the glorious victory on the Marne. The very soldiers who won this battle for him, for France, and for the liberty of the world, gave him the affectionate nickname "Papa," to express their appreciation of his paternal care for them and their trust in him.

John was nicknamed "Lackland" because, unlike his elder brothers, his father, King Henry II, at first gave him no possessions on the Continent; but later he was endowed with castles, lands, and revenues on both sides of the channel. John showed his characteristic ingratitude by joining his brother Richard the Lion-Hearted in conspiring against their father, and it was the discovery of this treason that brought the old king to his grave. When Richard became king he confirmed John in his possessions and added others; but John again conspired during Richard's absence on the Third Crusade.

The Barons Choose John as King

On Richard's death in 1199 the barons chose John to be king, despite the claim of his nephew Arthur, the son of another brother, Geoffrey, who had died some time before. Two French provinces took up arms in young Arthur's support, but he himself fell into the king's hands and died soon after, undoubtedly murdered by John's command. In the war which followed, on other grounds, with the king of France, John lost all his French possessions except Aquitaine.

Then came a quarrel with Pope Innocent III over the nomination of Stephen Langton as Archbishop of Canterbury. John resisted the pope's choice, and in the struggle he was excommunicated and the nation was put under an interdict; that is, all religious services were forbidden except baptism and extreme

unction. John's resistance was broken at last by the pope's threat to depose him and by the growing disaffection of his subjects. He not only received Langton as archbishop, but he abjectly agreed to hold England as a fief from the pope and to pay a yearly tribute. While John was absent on the Continent, seeking to regain his forfeited fief of Normandy, the barons of England united to resist the tyrant's rule. They mustered a powerful force and with the encouragement of Archbishop Langton marched against the king demanding a charter of liberties. Deserted by all but a handful of mercenary followers, John wrathfully recognized his powerlessness, met the barons at Runnymede on June 15, 1215, and put the royal seal upon the Great Charter (*see* Magna Carta).

But John had no intention of abiding by his grant and sought the pope's aid to free him from his oath to support the Charter. He raised an army and harried with fire and sword the estates of the barons, who in despair offered the crown to Louis, the son of a French king. Louis landed with a great army, and received the submission of a large part of England. In the midst of the war, while the issue was still doubtful, John died of a fever—caused, it is said, by eating too heartily of green peaches and new cider—leaving to his nine-year-old son, Henry III, the task of restoring the distracted kingdom.

The STORMY CAREER of ANDREW JOHNSON

The Tailor's Apprentice who Became President—How, in the Bitter Politics of a Border State, He Fought to Keep the Union from Breaking and Later Fought with Congress as to the Best Policy in Putting It Together Again

JOHNSON, ANDREW (1808-1875). "The only way to fight error is to strike it a direct blow," Johnson once said. "Hit it between the eyes and drop it to its knees. If it trembling rise again, strike it and continue to strike, till it shall rise no more."

And on another occasion he said: "When I die, I desire no better winding sheet than the Stars and Stripes, and no softer pillow than the Constitution of my country."

These sentences express the emotions which dominated the entire life of Andrew Johnson, who was once the most bitterly hated man who ever sat in the presidential chair, but who is now coming to be recognized as one of the great figures of his times.

Johnson was born in Raleigh, N. C. His father died when the boy was four years old; and at the age of ten Andrew was apprenticed to a tailor so that he might learn to make his own living. He had never gone to school a day, but while working as an apprentice he determined to learn to read. A gentleman frequently visited the tailoring shop where he worked and read to the employees speeches of British statesmen. Young Johnson was so interested in these that the man gave him the book, and with the aid of his fellow-workers he learned to read the speeches for

himself. After he was married and had started in business for himself at Greeneville, Tenn., his wife taught him to write and to do simple problems in arithmetic.

At the age of 20, Johnson began his political career in the humble position of alderman of Greeneville. He was elected to the office as the workingmen's candidate, in opposition to the slaveholding aristocracy of the town. From this time on, until 1843, he served almost constantly as alderman, mayor, or member of the state legislature.

In Congress, where he served from 1843 to 1853, as in local offices, he still represented the interests of the common people. In 1845 he introduced the first "homestead bill," to give landless citizens farms from the public lands. The bill was defeated by the slaveholders of the South, because it would mean eventually more free states in the Union; but the issue was brought up again and again, until it was finally passed in 1862, after the secession of the slave states.

The aristocracy of the South not only opposed Johnson's homestead policy, but they also despised the man because he had worked with his hands. He is probably the only man in the South, before the Civil War, who having done manual labor for a

living still won the proud positions of state governor (1853-57) and United States senator (1857-62).

When secession came in 1860-61 Senator Johnson attracted the attention of the North by his arguments for the Union, and he was the only Southern senator who did not resign and go with his state. In the border states the feeling between the Unionists and Confederates was more bitter than any place else. Johnson's work for the Union in Tennessee, and his acceptance of the position of military governor in 1862, shows his great physical courage, as well as his loyalty. He organized the part of the state which was under control of the Northern forces, and began the work of reconstruction, in which he was destined as president to play a prominent part.

In recognition of his work for the Union, and to secure the votes of the war Democrats, to which party Johnson belonged, the Republicans in 1864 nominated him for vice-president on a Union ticket with Lincoln.

When Johnson was called to the presidency by the assassination of Lincoln, in 1865, he was confronted by the most difficult situation a president ever had to face. The war was over, but the ravages of the conflict were still to be repaired and the Union restored. The bitterness of the people of the North was increased by the death of Lincoln, for which they held the South responsible; and a triumphant majority of both houses of Congress were demanding harsh measures against the defeated states.

It was a situation which would have taxed the great powers of Lincoln and it exceeded those of the former vice-president. With all his ability and honesty, Johnson had never made good the defects of his early training. He was tactless, lacking in good taste, boastful, given to abusive speech, and fond of quarreling; while the leaders of Congress were men with whom Lincoln would have been forced to differ.

At first many leaders of Congress thought that "the accession of Johnson to the presidency would

prove a godsend to the country." They felt that Lincoln would have been too merciful to the Southerners, and that as Johnson had always been bitter towards the "rebels," the country would be safer in his hands. Senator Wade, of Ohio, when congratulating Johnson, said to him:

"Johnson, we have faith in *you*. By the gods, there will be no trouble now in running the government."

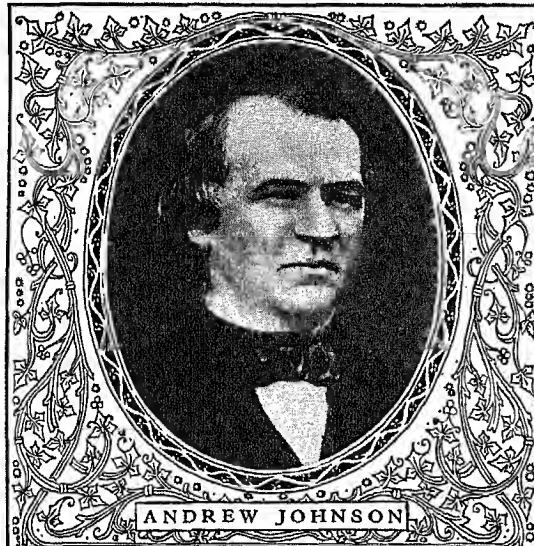
During his first weeks in office Johnson seemed to justify their faith. He loudly proclaimed that "treason must be made odious, and traitors must be punished and impoverished." But suddenly he changed his attitude and adopted the merciful policy of Lincoln, with infinitely less chance of success.

Before Congress met in December he had recognized state governments in all of the seceding states which had not been reconstructed under Lincoln. Congress refused to admit members from these states, and proceeded to ignore Johnson's acts and to lay down a far more severe policy for the treatment of the South.

The remainder of Johnson's administration was the bitterest fight ever waged between a president and his congress. Johnson was a firm states' rights Democrat, and hence he

vetoed a bill indefinitely continuing and increasing the powers of the Freedmen's Bureau, established to act as guardian of the emancipated slaves. He also vetoed a Civil Rights bill for the protection of the Negroes and putting all cases arising from it under United States courts rather than state courts. Johnson held that both these bills were unconstitutional and gave opportunity for dishonesty in administration, but Congress passed them over his veto, and then proposed the 14th amendment to the Constitution, the effect of which was to deprive the Southern states of their full share of representation in Congress unless they gave the Negroes the right to vote, and to exclude from office all who had taken part in the rebellion until they were pardoned by a two-thirds vote of each house.

Before the elections of 1866 the President appealed to the people to support his policies. He



JOHNSON'S ADMINISTRATION (April 15, 1865-1869)

- Amnesty Proclamation, with 14 classes excepted (1865).
- Civil Rights bill passed over President's veto (1865).
- 14th Amendment ratified (1866).
- Cable to Great Britain completed (1866).
- Reconstruction bill passed over veto (1867).
- Nebraska admitted (1867).
- Tenure of Office bill passed over veto (1867).
- Alaska purchased from Russia (1867).
- French forced to quit Mexico (1867).
- President acquitted on Impeachment trial (1868).
- 15th Amendment ratified (1870).

made a tour through the country—known as his “swing around the circle,”—during which he spoke bitterly of Congress; but he lost support, rather than gained it, by his personal abuse of his opponents.

In 1868 the quarrel between Johnson and the partisan leaders in Congress came to a head, when the President sought to remove Edwin M. Stanton as his Secretary of War, to make room for General Grant. This was in violation of a Tenure of Office Act passed by Congress in 1867 to tie the President's hands. Stanton resented removal and the Senate upheld him. The high-handed majority in Congress then determined to impeach Johnson himself and remove him from the presidency. The grounds of the charges were admittedly political. The vote in the Senate, which acts as the court of trial in impeachment proceedings, stood 35 for removal and 19 against it. As 36 votes—two-thirds of the members—were necessary for conviction, Johnson's impeachment was not upheld and he was permitted to serve out his term of office.

The Trouble over Mexico

The bitterness of the struggle over reconstruction and the disorders of the carpet-bag governments in the South blinded the people to an important development in international relations. During the Civil War the French emperor, Napoleon III, had placed Maximilian of Austria on the Mexican throne and kept him there by means of a French army. For a time the United States was too busy with its Civil War to do more than protest against this violation of the Monroe Doctrine; but in 1867 President Johnson forced the French to withdraw. Maximilian of Austria was then captured and shot to death by the Mexican patriots.

Another international development was the purchase of Alaska in the same year—bought from Russia for \$7,200,000 on recommendation of Secretary of State Seward. As gold had not yet been discovered in that region, and as most people looked upon Alaska as merely a cold barren waste, they thought this was a bad bargain and contemptuously referred to it as “Seward's folly.”

Partisan feeling for a time blinded people to the good points in Johnson's policy. Today we can see that much of the bitterness and most of the evils of the reconstruction period would have been averted if Congress had followed his leadership.

“No American has ever had a lonelier or more treacherous path to tread,” says one of his recent biographers. But, a fighter to the end, he went back to his own state to seek vindication. His triumph came at last in 1875, when he was elected senator. Public feeling had changed, and messages of congratulation poured in from all parts of the country. But his victory was too late, for he died a few months after his election.

JOHNSON, SAMUEL (1709-1784). As a boy in Lichfield, England, where he was born, Johnson gave early promise of the powers of mind which were one

day to make him the literary dictator of his times. He “gorged,” as someone has said, the books in his father's bookshop. The days of his early manhood however were filled with disappointment and failure. His father lost most of his money, and the son found that the family poverty made it impossible for him to continue his studies at Oxford and take his degree. He fell in love and married at the age of 26, and with the aid of his wife's small fortune set up a school for young gentlemen near Lichfield. But the school failed after a year or two, and Johnson set off for London to seek his fortune. With him went David Garrick, his favorite pupil, who was to become the greatest actor of his times.

The early days in London were so full of hardship that years later Johnson is said to have burst into tears on recalling them. He reported parliamentary speeches, taking care as he frankly said “that the Whig dogs should not have the best of it.” He made translations for the press, his knowledge of Latin and Greek serving him well. He made catalogs for booksellers, one of whom he knocked down for reproving him for negligence. Hard as Johnson worked, he just barely made a living for himself and his wife. Often he walked the streets at night for the want of a few pence for a lodging. But even in those pinching times, he would put pennies into the hands of poor little children sleeping in the streets. For all his brusqueness, he was always gentle of heart.

The Famous Johnson Dictionary

Gradually Johnson's reputation grew; he became well known to the publishers and booksellers of London. One of them, Robert Dodsley, suggested that an English dictionary would be well received by the public. Johnson had already dreamed of such a work, and when a combination of booksellers offered him a considerable sum for the undertaking he accepted. The amount (about \$7,800) seems large at first thoughts, but when one considers that the ‘Dictionary’ took almost eight years to complete, and that Johnson had to pay his assistants out of his own pocket, one can see that he was not yet free from money worries. Nowadays, Johnson's ‘Dictionary’ seems old-fashioned and unscientific; it was however far better than those which preceded it and paved the way for the better ones which we have. The personal note seems amusing to modern readers. Thus Dr. Johnson often permitted his own experience and his own intense prejudices to color the definitions he wrote. Some of these follow:

Excise. A hateful tax levied upon commodities, and adjudged not by the common judges of property, but wretches hired by those to whom excise is paid.

Grubstreet. Originally the name of a street in Moorfields in London, much inhabited by writers of small histories, dictionaries, and temporary poems; whence any mean production is called *grubstreet*.

Lexicographer. A writer of dictionaries; a harmless drudge, that busies himself in tracing the original, and detailing the signification of words.

Pension. In England generally understood to mean pay given to a state hireling for treason to his country.

The 'Dictionary' brought Johnson such fame that the University of Oxford conferred upon him the degree "Doctor of Laws" (LL.D.). But it did not bring him much relief from poverty. In the 18th century men were often given pensions in recognition

When Johnson had first come to London he had found dinners for sixpence, and coffee houses where by paying threepence he spent long hours talking to his friends. Good company and good dinners he loved more than anything on earth. "I look

THE GREAT DOCTOR AND HIS BRILLIANT FRIEND



The big man taking snuff is the great Doctor Johnson, and walking beside him is his brilliant friend, Goldsmith. When the Doctor wrote, his style was big and heavy, like the man himself, and Goldsmith once said to him: "Doctor Johnson, if you could make little fishes talk, they would talk like whales." Perhaps that's what Goldsmith is saying to him now.

upon a day as lost," said he, "in which I do not make a new acquaintance." He ate enormously of such dishes as roast pork or veal pie stuffed with plums and sugar. His tea-pot held two quarts, as well it might, for he boasted of having drunk 25 cups at a sitting. To take dinner with Dr. Johnson in one of the London taverns—often in the Cheshire Cheese, which is still there—and to hear his brilliant, witty table-talk was considered well worth while. Thus grew up his famous Literary Club, which included Garrick the great actor, Reynolds the artist, Gibbon the historian, Sheridan, and Goldsmith, whose writings live today while most of Dr. Johnson's are forgotten, and others. There were women, too, who enjoyed an evening of conversation with the great man. They could hear him talk at the home of Henry Thrale, a wealthy London brewer, who was always a generous friend to him. There he met "little Burney" (Fanny Burney) who wrote 'Evelina', and there he formed the friendship with Mrs. Thrale which was to mean so much to him.

Today few people read Johnson's books because he wrote in a learned and ponderous style—often jokingly called "Johnsonese." Even in his own time the wags said that the "hard words were used to show how necessary was a large folio dictionary," such as he himself had written. Goldsmith once said to him: "Dr. Johnson, if you could make little fishes talk, they would talk like whales." No one is likely, however, to lose sight of him. He has been made too impressive and interesting

of literary work or as a mark of political favor. In 1762 the government decided to bestow a pension of \$1,500 a year upon Dr. Johnson. The author of the 'Dictionary' was rather hesitant about accepting the money. Had he not defined pension in his own pages as "pay given to a state hireling for treason to his country"? Had he not defined patriotism as "the last refuge of a scoundrel"? The prime minister, Lord Bute, reassured him, saying the money was given him for what he had done, not for what he was to do.

a character to us through Boswell's 'Life'.

A Writer Greater than All He Wrote

In 1763 James Boswell, a young Scotch lawyer, met Dr. Johnson and became his admirer and friend. No words of his idol escaped him. He put them all down on paper and published them for the world to read after Johnson's death. And they are well worth reading; Dr. Johnson might be ever so involved and Latinistic in writing—in conversation he was pithy and colloquial. We hear him say: "Being in a ship

is like being in jail with the chance of drowning," which is as simple as one could make it. We see him as the tender-hearted friend, the generous alms-giver, for in the last years of his life he used his pension mainly for the poor. We see his sturdy independence of thought and his stubborn prejudices. Boswell records such gems as: "While you are considering which of two things you should teach your child first, another boy has learned them both"; and "Life is a pill which none of us can bear to swallow without gilding"; and "It is better to live rich than to die rich." In spite of the fact that the 'Dictionary' is now only a literary curiosity, and that no one today reads his essays or criticisms, Johnson, the man, will live on. Boswell's 'Life' will still preserve for us the picture of this strange, uncouth, great-hearted man—so eccentric that his grimaces, gestures, and mutterings often terrified people who did not know him, so oddly minded that at times he could not pass through a street without touching with his fingers every post in it, so learned and brilliant in his talk that the proudest and best were glad to gather at his feet.

Johnson's chief works aside from his 'Dictionary' were: *Poems*—'London' (1737) and 'The Vanity of Human Wishes' (1749); *drama*—'Irene' (1737); *essays*—'The Rambler' and 'The Idler' (1758-60); *novel*—'Rasselas' (1759); *criticism*—'Lives of the Poets'.

JOLIET (*zhō-lyā'*), Louis (1645-1700). When Jacques Marquette was an eight-year-old lad, in Laon, France, there was born in the little frontier village at the foot of the rock of Quebec in Canada a boy whose name—Louis Joliet—became forever linked with his own in the French discovery of the Mississippi River.

Like Father Marquette, Joliet intended to become a priest. But after he had studied at the Jesuit College in Quebec, he abandoned this intention, and became instead a fur-trader and explorer. He was selected by Count Frontenac, governor of Canada, to go with Marquette in 1673 to explore the western country and push on to the Mississippi. (For an account of the exploration see Marquette, Jacques.) On his way back to Quebec, Joliet's canoe was upset and all of his maps and papers were lost, so that the only accurate report of the expedition is Marquette's. The information obtained by the expedition proved of material assistance to La Salle, who was largely guided by it when he explored the Mississippi to its mouth in 1682. (See La Salle.)

In recognition of his services Joliet was given the island of Anticosti in the Gulf of St. Lawrence, and later the seigniory of Joliet, south of Quebec, which is still in the possession of his descendants.

JOHN PAUL JONES — *Born Fighter*

*The Earliest of America's Great Naval Captains, this Son of a Poor Scotch Gardener
Cast His Fortunes with the Colonists and Became One of the Most Daring
and Successful Commanders that the Sea Has Ever Known*

JONES, JOHN PAUL (1747-1792). "This man was born a captain." These words were originally applied to a French general of the 17th century, but they have been used with equal truth to characterize John Paul Jones, the first naval hero of the United States. Jones was also a born fighter, as is shown by his famous expression: "I do not wish to have command of any ship that does not sail fast, for I intend to go in harm's way."

His whole life was a fight. From an obscure family, with meagre advantages, he fought his way up until before his death he was one of the most accomplished officers in the United States, and a man whom the greatest men of France and America honored with their friendship.

His father was a poor Scotch gardener, John Paul. The son was named for his father, and after he came to America he added the name of "Jones," probably because of his friendship with a well-known family of that name in North Carolina.

At the age of 12, John Paul became a sailor, going on his first voyage to America. The boy progressed rapidly in his chosen career. At 19 he was the chief mate on a slave-trading vessel, an occupation which was considered perfectly honorable in that day, but which filled him with disgust. At 21 he was captain

of a trading vessel, but in 1773 he left the sea and settled in Virginia on a plantation which he had inherited from his brother William, who had emigrated to America years before while John Paul was still a boy.

At the outbreak of the Revolution Jones journeyed to Philadelphia to offer his services to his adopted country in its struggle for independence. Before Christmas he raised the pinetree-and-rattlesnake flag on the first American man-of-war. In 1777 he floated the newly adopted Stars and Stripes from the *Ranger*, and carried to France the news of Burgoyne's surrender. While in harbor in France he received from a French man-of-war the first salute ever given by another nation to the American flag.

From France he sailed to the western coast of England, destroyed the shipping at Whitehaven, and defeated the guardship *Drake* in the English Channel. Returning to France, then an ally of America, he asked for, and finally received, a naval vessel which he named the *Bonhomme Richard* in compliment to Franklin, the American minister to France whose *Poor Richard's Almanac* was very popular at that time. With this vessel Jones fought the famous battle with the *Serapis* on Sept. 23, 1779. After several hours of such fighting as had rarely been seen

on the seas, the English commander called upon Jones to surrender, but although his ship was sinking, that intrepid commander responded, "I have not yet begun to fight," and in a short time he compelled the English to surrender to him. For this victory Jones received a gold medal from Congress. It was richly deserved, for such victories were gained where England was strongest—on the sea—and they threatened her commerce and the flow of supplies and troops to her armies in America.

After the Revolution Jones entered the Russian navy. But he soon tired of the court intrigues, resigned his commission, and retired to Paris, where he spent the rest of his life. He was buried in a little Protestant cemetery in that city, but in 1905 his body was brought to America, and interred at the United States Naval Academy at Annapolis, Md. Thus after more than a hundred years of neglect his adopted country paid fitting honor to the memory of this man who ranks with Farragut and Dewey as one of the great captains of the American navy.

JONSON, BEN (1573?-1637). Into the charmed circle of wits that gathered at the Mermaid Tavern in Elizabeth's golden reign, swaggered swashbuckling Ben Jonson, back from the wars in the Low Countries. An acute scholar, a vigorous dramatist, a rare lyric poet, a keen and outspoken critic—ready to fight with pen or sword—he dominated that brilliant company while Elizabeth was succeeded by James I, and James by Charles I, and the Mermaid gave place to the Devil's Tavern.

Jonson entered the London theater as actor and playwright just when the English drama had flowered to unrivaled perfection under Shakespeare's magic touch. His first comedy, 'Every Man in his Humor' (1598) had Shakespeare in its cast. Jonson fought to keep the drama at its high pitch, holding firmly to the classical standards. When sensationalism swept the stage, he turned from the drama to the masque, and wrote many of these elaborate entertainments for the court of his patron, James I. This monarch granted him an income, which Charles I afterward increased, and he enjoyed a small salary as chronologer of London. He was buried (in a standing position) in Westminster Abbey; his grave bears

the epitaph "O rare (supposed by some to be intended for 'Orare', meaning 'pray for') Ben Jonson."

Jonson's great tragedies were 'Sejanus' (1603) and 'Catiline' (1611); his best known comedies, 'Volpone, or the Fox' (1605), 'Epicoene, or the Silent Woman' (1609), 'The Alchemist' (1610), and 'Bartholomew Fair' (1614); his best loved song, 'Drink to Me Only with Thine Eyes'.

JOHN PAUL JONES



This statue of the famous naval hero stands in Washington, D. C. It is the work of the sculptor, G. V. Buck.

JOSEPH. The story of Joseph in the Old Testament is one of the masterpieces of all literature. The patriarch Jacob gave Joseph, first-born son of his favorite wife, Rachel, a "coat of many colors." This was a token that Joseph should succeed him as chief of the tribe of Israel. Jealousy flamed among the ten older brothers, and as Joseph tended his sheep at Dothan in the land of Canaan, his brothers sold him to Ishmaelite traders, who carried him in slavery into Egypt. The brothers dipped the coat in the blood of a kid, and Jacob cried when he saw it: "An evil beast hath devoured him!" Potiphar, an officer of Egypt's Pharaoh, bought Joseph, and made him master of his household. Potiphar's wife, by false charges, caused Joseph to be cast into prison, but Pharaoh made Joseph his prime minister when Joseph interpreted his dreams to mean that Egypt faced seven years of plenty and then seven years of famine. In the years of plenty Joseph stored up great quantities of grain. In the years of famine Joseph's ten elder brothers and Benjamin, younger than Joseph, went to Egypt to buy grain, and Joseph eventually installed his father and Jacob's whole tribe in Egypt. Joseph fathered the tribes of Ephraim and Manasseh. (See Jews.)

JOSEPHINE, EMPRESS OF THE FRENCH (1763-1814). The most splendid monument in the island of Martinique in the French West

Indies is the statue of a woman. It is that of Josephine Tascher de la Pagerie, a native of Martinique, who was raised by the genius of her second husband, Napoleon Bonaparte, to the position of Empress of the French.

After her first husband, General Beauharnais, was killed during the Reign of Terror, she was left with two children and a good place in Parisian society, which she kept by use of her wits and charm. Only with reluctance was she induced to marry Bonaparte, then a little-known artillery officer, desperately in love with her. She gave him a social acquaintance

which he had not enjoyed before. Within ten years he had made her Empress of the French, a position for which she was fitted by the charm and graciousness which concealed a very limited education.

Napoleon's love, however, cooled, and in addition she failed to bear him children. In 1809, in spite of her tears and entreaties, she was forced to consent to a divorce. Napoleon wished to secure an heir to his throne and to ally himself with the royal families of Europe, and soon afterwards he married Marie Louise of Austria. The title of Empress of the French was left to Josephine, however, and the Château de la Malmaison near Paris was given to her. There she died in 1814, soon after Napoleon's first abdication.

Her two children by her first marriage were Eugeno and Hortense. Eugene proved an able and loyal general under Napoleon and was for a time viceroy of Italy. Hortense married Napoleon's brother, Louis, and became the mother of Napoleon III, president and later emperor.

JUGOSLAVIA. This kingdom of 96,000 square miles was formed in 1919 after the World War from parts of the old Austro-Hungarian Empire, together with Serbia and Montenegro. The official title of the state was originally Kingdom of the Serbs, Croats, and Slovenes, but this was changed in 1929 to Yugoslavia (also Jugoslavia), a term meaning South Slavs. (See Yugoslavia.)

JULIUS, POPES. The first pope of this name, JULIUS I, SAINT (Pope, 337-352), ruled the affairs of the church in the difficult days of the Arian heresy, when the Eastern emperors were persecuting the bishops who held fast to the creed adopted at Nicaea in 325.

JULIUS II (Pope, 1503-1513) was a member of the della Rovere family, and is remembered equally for his wars to secure and enlarge the papal states, and for his munificent patronage of Raphael, Michelangelo, and other artists of the Renaissance. Under the first head he drove Caesar Borgia out of Italy; and entered into the League of Cambrai (1508) and then the opposing Holy League (1511) with European sovereigns, and even led his armies in person to advance his warlike plans. On the other hand he was a most liberal and energetic patron of art in that time when supreme artists flourished. He tore down the old basilica of St. Peter's to make room for the present one; and for him Raphael and Michelangelo did some of their best work. His successor, Leo X, continued the work of encouraging art and literature.

JULIUS III (Pope, 1550-1555) was less distinguished, but was closely connected with the work of the Council of Trent and sought to aid the Queen of England in restoring that land to the Catholic fold.

JULY. This is the seventh month in the year in our calendar, and the fifth in the Roman calendar, whence it was called *Quintilis* (the fifth). It was later named July in honor of Julius Caesar. It has had thirty-one days from the time of the early Roman calendars. The "July Revolution" is that in France in July 1830, which set aside the Bourbon king, Charles X, and placed his cousin, Louis Philippe on the throne.

JUNE. Three Roman origins have been suggested for the name of this month—in honor of the goddess Juno,

the queen of heaven; from the Latin word which means "to join"; and from *juniores*, the young people as opposed to the older ones, to whom some say it was dedicated. Any of these origins seem reasonable enough, for it is the queen of months, since "then if ever come perfect days." It is the month of weddings, and the tides of youth beat fullest and strongest when we are "knee-deep in June." The summer solstice occurs in June (see Equinox and Solstice). Before Julius Caesar reformed the calendar June had only 29 days; he added the 30th.

JUNE BUG. If you sit in a lighted room with open windows on a late spring or early summer night, you are almost sure to hear before long the buzzing and bumping of a heavy-flying insect against the

ceiling and walls. Presently the visitor will fall to the floor with a thud, and you find a dark-brown beetle about an inch long lying on its back kicking and struggling awkwardly to get on its feet. This is the "June bug" or "May beetle," a member of the scarab beetle family, and a pest.

Although the adult beetles do much damage by eating the leaves of trees and shrubs, it is the larvae or young that are especially harmful. They are white "grubs" as large as the end joint of a man's little finger, with brown heads, that live in the ground for two years or more, and devour the roots of grass and plants. Strawberry beds suffer particularly.

The best way to get rid of the larvae or grubs is to make a weak emulsion of kerosene soap and filter it into the ground. The adults can be killed by using lights to attract them into pans filled with pure kerosene. Scientific name of the genus, *Lachnosterna*.

JUNIPER. Peculiar among the conifers is the juniper, characterized by its berry-like seed cones, which cling tightly to the branches, their gray-blue coloring harmonizing with the dull green of the needle-like foliage. The branches grow irregularly, the branchlets shooting out at all angles. This very ruggedness is charming and causes the juniper to be prized as an ornamental tree, the Japanese especially cultivating these picturesque effects by pruning and training the limbs to fantastic forms.

THE EMPRESS JOSEPHINE



This Pierre Prud'hon painting in the Louvre pictures the young and beautiful Josephine whom Napoleon loved and married, and on whom he bestowed the title, "Empress of the French."

There are about 40 species widely distributed in the nontropical parts of the Northern Hemisphere. These trees live to a great age; one ancient juniper in the Cache National Forest, in Utah, is estimated to be at least 3,000 years old.

Best known in the United States is the eastern red cedar (*Juniperus virginiana*). The chief remaining stands of this are in the mountains of Tennessee, Arkansas, and Kentucky, though it is found from Canada to the Gulf of Mexico. The widest use has been for pencils, but the scarcity of this lumber now requires the substitution of varieties of juniper not found in North America, and of incense cedar. Red cedar fence posts are in demand because of their resistance to decay, and the largest portion of the annual cut is now used for that purpose. The red aromatic heartwood is used for moth-proof chests. Unfortunately this tree is a host for the cedar-rust fungus, which attacks apple trees.

Most junipers vary in size and shape from tall, columnar forms to low pyramids and platter-like, creeping shrubs used in ornamental plantings. These differences occur especially in the Chinese juniper (*Juniperus chinensis*) and its varieties, native to Eastern Asia. The western juniper (*Juniperus occidentalis*) of the Pacific coast is used for railroad ties. It is an especially rugged tree and grows even in the crevices of the granite ledges of the Sierra Nevada. The common juniper (*Juniperus communis*) is found throughout the Temperate Zone. The berries (cones) of the last are used to flavor gin.

JUNO. The chief Roman goddess was Juno, who was identified with the Greek goddess Hera (see Hera). She was the wife of Jupiter and was looked upon especially as the deity of women and of marriage. The calends (first) of each month were sacred to her, and she was worshiped with Jupiter in the great temple of the Capitol as "Juno Regina," queen of heaven. She also had a shrine as "Moneta" (from the Latin *monere*, "to advise"), goddess of admonition or good counsel. From this name the words "money" and "mint" originated, because money was made in a mint attached to this shrine. One of the minor planets between Mars and Jupiter is named for Juno (see Asteroids).

JUPITER. In the name Jupiter the first part "Ju-" comes from the same root as the Greek "Zeus," and the last part "-piter" is another form of *pater*, or "father." So Jupiter means "Zeus the father" (see Zeus). Jupiter was the chief Roman deity, in a great temple on the Capitoline Hill. The largest of the planets also bears this name (see Planets).

JURA (jū'rá) MOUNTAINS. The same geological force which crumpled the earth's crust and formed the magnificent and lofty Alps produced the low uneven Jura Mountains, on the border of France and Switzerland. These mountains cannot boast the grandeur and beauty of the Alps, and the area covered by them is but a small part of that of the Alps. The highest elevation, Crêt de la Neige, is only 5,653 feet, and the average height is no more than 2,600 feet.

The Jura Range is about 156 miles long by 38 miles broad, and extends from southwest to northeast from the elbow of the Rhine to the elbow of the Rhone. Except for its central portion the range is cut by many deep, sharp cross-ravines and valleys. The westward side of the mountains descends by gentle slopes to the fertile plains of France, but the eastern side is precipitous, and its foaming streamlets dash down to the rocks to feed the placid waters of Lake Geneva and Lake Neuchâtel.

At the extreme north end of the range is the famous Belfort Gap, a broad pass in the low rolling hills between the Vosges and Jura Mountains. This pass may well be called the "front door of France," for it opens on the most beautiful, fertile, and prosperous section of the country and is the great highway between eastern France and central Europe. In 1870-71 this was one of the roads by which Germany invaded France; but in 1914-18 and in 1939-40, when the Germans and the French were again engaged in war, this was not a major route of invasion.

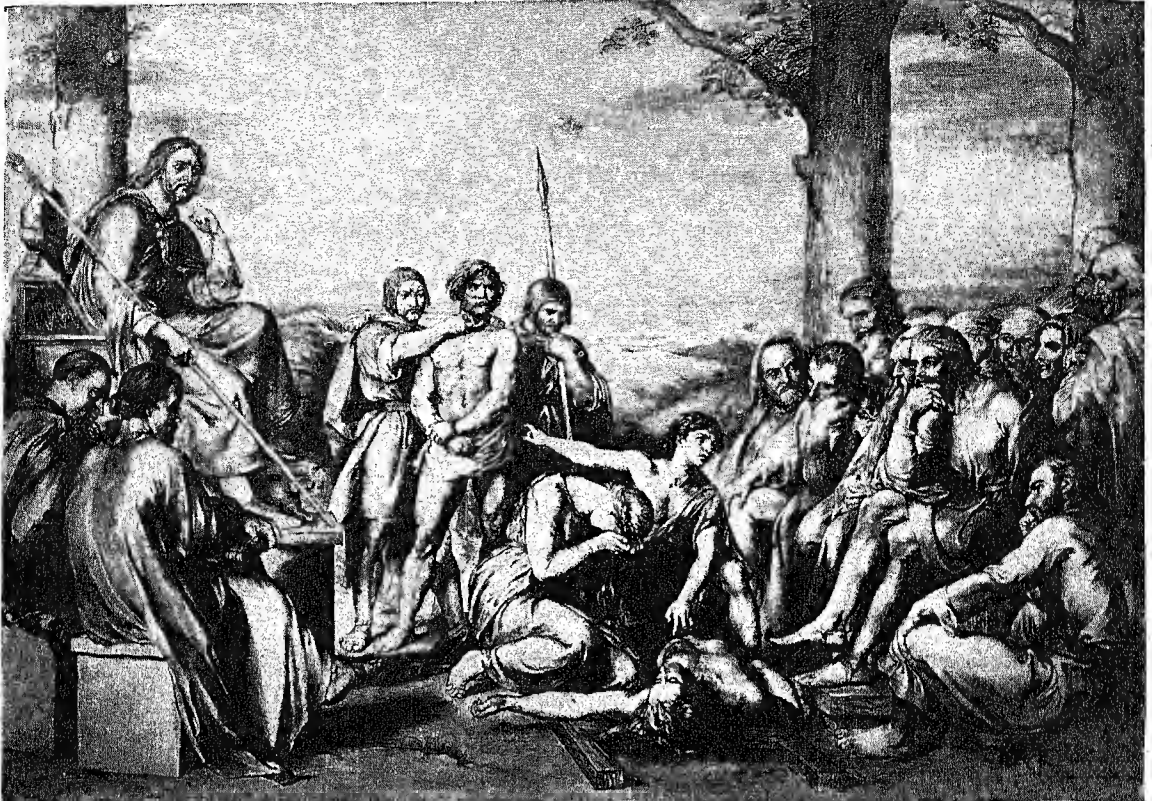
The peasants pasture their flocks on the grassy uplands of the Jura and some farming is carried on, mostly wheat raising. Mining is of little importance. The mountains are more sparsely wooded than the Black Forest, though the southwest section is famous for its wooden toys manufactured from the boxwood which grows in the mountains. Flourishing little cities have been built on the slopes of the mountains. Watches and spectacles are among the manufactures. The climate throughout is cold and damp in winter, and except in scattered watering places few tourists visit the region.

JURY. In an enclosed space in the courtroom, at the left of the judge, sit the 12 members of the trial jury. They may be both men and women, for many states allow women jurors. They listen to the evidence given by the witnesses, to the arguments of the attorneys, and to the judge's instructions. Then they retire to a room where they are locked in and guarded. The judge may keep them there as long as he has a reasonable hope that they will reach a unanimous agreement. When they have decided on their verdict, they return to the courtroom, and the *foreman* whom they have chosen announces their decision. In civil cases they find "for the plaintiff" or "for the defendant"; in criminal cases their verdict is "guilty" or "not guilty." If they cannot agree, they are dismissed; and a new trial may be held with another jury.

In criminal cases an acquittal is final, and the prisoner may not be tried again on the same charges. If the evidence is clearly insufficient to establish guilt, the judge may direct a verdict of not guilty. After a verdict of guilty, he may grant a new trial if it should appear that legal error was permitted in the conduct of the case.

A trial jury is called a *petty* or *petit jury* (meaning "small jury") because it has only 12 members. In some states, in civil cases and in minor criminal cases there may be fewer than 12 jurors.

A TRIAL IN THE DAYS OF KING ALFRED



This famous picture by C. W. Cope portrays an Anglo-Saxon institution which bore a marked resemblance to the modern grand jury. The twelve senior "Thegns" of a district were appointed to hear the charges against any man accused of a crime and determine whether the evidence warranted holding him for a test of his guilt or innocence by compurgation or by ordeal.

The work of the *grand jury* comes before that of the *petit jury*. It is its duty to decide, after hearing in secret the preliminary evidence against a man, whether the state shall accuse him of a crime and hold him for trial. This grand jury, or great jury, usually has 23 members, though the number varies in some states, at times being only 12. Whatever the number on the grand jury, 12 members must agree. If they think from the evidence they have heard that the accused is probably guilty, they *indict* him or "bring in a true bill," and then he is tried by a *petit jury*. Cases usually come before a grand jury as a result of activity by the police, sheriff, coroner, or state's attorney. But they may start investigations on their own motion or at the suggestion of a judge.

The men who are eligible to serve on trial juries are selected by lot. The names of citizens eligible for jury service are placed in a locked box and drawn out as needed. When a man's name has been drawn he is summoned to serve by the sheriff. If it is a criminal case he is closely questioned in open court by the opposing lawyers. If he is acceptable to both sides he is passed, but if his answers show that he is prejudiced or has fixed opinions on the guilt or innocence of the accused, or objects to the penalty that may be inflicted, death for instance, he is excluded "for

cause" by the judge. Each side may also exclude by "peremptory challenge" an agreed number without stating a cause. Ministers, lawyers, newspaper men, men in the army, navy, and militia, election and government officials are usually exempted from service.

A *coroner's jury*, usually composed of six men, may be specially summoned by the coroner to decide whether a sudden death was due to murder, suicide, or other causes, and therefore whether or not some person under suspicion of causing the death should be held for further investigation by the grand jury.

In civil cases—that is, in controversies between individuals—juries are widely used to decide questions of fact. The judge applies the law to the facts as the jury finds them to be, and renders judgment. Under certain circumstances the judge can direct a verdict, or if a verdict is manifestly improper, he can set it aside. Usually juries in such cases are not confined during the trial, as they are in important criminal cases.

Of all Anglo-Saxon political institutions, the jury is one of the oldest. The Normans adopted one of the most primitive forms after they conquered England in 1066. But the men who served at these "inquests," as they were called, were chosen not to listen to witnesses, but to decide on the basis of their own knowledge of the facts. This sworn inquest

was used by the king chiefly in transacting the business of the kingdom, but it represented also participation by the freemen in one of the important aspects of government. Not until the reign of Henry II, in the 12th century, were the jurors generally changed from those who knew the facts to men who must decide solely on evidence that they heard in court. A few centuries later the 13 American colonies gave as one of their grievances in the Declaration of Independence that the king had deprived them, in many cases, of trial by jury. When the Americans drew up the Federal Constitution, they provided that in federal courts there should always be a jury in criminal cases, and in civil cases when the amount in dispute was over \$20. The state constitutions have generally followed this example.

Early Forms of Trial

In Anglo-Saxon times, when the accused brought into court a number of his neighbors who were willing to swear to his innocence, he was released. In this trial by *compurgation* the number of compurgators needed depended upon the rank of the men who took the oath as well as upon the importance of the case. Then there was the trial by *ordeal*, which was really an appeal to God for a miracle. In the ordeal by fire, the accused plunged his hand into boiling oil or water, or carried a piece of red-hot iron, or walked barefoot over glowing plowshares; if the burn healed in three days, the accused was innocent. In the ordeal by water the accused was bound and thrown into a stream or pond; if he floated, the water had rejected him because he was guilty, but if he sank he was innocent and must be rescued. Finally there was the *trial by combat*, in which a man proved his case by defeating his adversary in battle.

Jury trial introduced evidence and reason in place of superstition, chance, or force. It is also important because it marked a step in the development of the representative system of government, for these early jurors were chosen as representatives of their community, and so are a link in the chain which included the Anglo-Saxon Witenagemot and led up to the British Parliament.

Although the right of trial by jury is one of the corner-stones of English and American legal procedure, trials are being conducted without juries in an increasing number of cases, both civil and criminal. Courts of special jurisdiction, such as small claims courts, domestic relations courts, and juvenile courts, now almost everywhere dispense with a jury. Judges often call on physicians, psychiatrists, and other experts for advice. Cases in equity, bankruptcy, and probate matters are usually decided by the judge, but often with the advice of a *referee* who gives the judge a detailed report of the facts as he found them. In some states the grand jury indictment has been replaced by a form of complaint called an *information*, which is filed by the prosecuting official. Several states do not require a unanimous verdict of the jury in civil, and in less serious criminal, cases.

This modern trend away from trial by jury requires explanation. Critics assert that the jury system is not adapted to the complex structure of modern society. Modern life produces many cases, both civil and criminal, involving countless factors which the layman does not understand. Strangely enough, in court practise, the attorneys on both sides are likely to excuse the more intelligent jurors, and try to retain men who are more likely to be moved by argument and prejudice. On the other hand, the abler citizens are often disposed to dodge jury service because so much of their time is wasted, either in waiting to hear a case or in hearing cases of trivial importance. It takes a long time to select a jury from a panel of citizens (a panel is usually 100 names selected by lot from the list of voters).

To overcome these objections, which some critics assert have destroyed the usefulness of the system, it has been recommended that the *veniremen* (*venire* being the legal term for a summons to jury service) be investigated before they are called, that fewer professions and trades be exempted, and fewer peremptory challenges be allowed. Defenders of the jury system say that to abolish it would be to destroy one of the few phases of government in which the citizen can take actual part, and would tend to produce a belief that the courts are not conducted for the average man and woman.

JUSTINIAN I (483?-565). Most illustrious of all the emperors of the Eastern Roman or Byzantine Empire, Justinian well deserves the title of "the Great," by which he is commonly known. Unlike many of the Eastern emperors, Justinian not only was a strong ruler in his own part of the world, but he exercised a profound influence in the Western World even to our own time. For Justinian was responsible for the codification of Roman law, which is the basis, through the 'Code Napoleon', of the legal systems of most European countries and of one American state, Louisiana. One maxim of Roman law, "All men are created equal," played a great part in the American and French revolutions. The 'Code' of Justinian is a collection of decrees of the emperors; the 'Digest' or 'Pandects', is a summary of 9,000 extracts from the opinions of lawyers and judges who had interpreted these decrees; and the 'Institutes' was a textbook, stating legal principles in simple terms. A fourth book, the 'Novels' (*Novella constitutiones*) includes the ordinances of Justinian after the codification. These four together constitute the Civil Law (*Corpus Juris civilis*).

Statesman and Builder

Justinian dreamed of restoring the Roman Empire to its ancient splendor. His generals, Belisarius and Narses, drove the Ostrogoths out of Italy and the Vandals out of Africa, and temporarily restored those lands to the Empire. He was also a great builder, and throughout his vast empire erected forts, aqueducts, and churches. The most splendid of these buildings is the church of St. Sophia, one of the

masterpieces of Byzantine architecture (see Architecture). Justinian also endeavored to end the disputes between the eastern and western branches of the Christian church. During most of his reign he controlled the elections of the popes and helped to regulate church affairs generally.

This great figure in history came of Slavic peasant parentage, it is believed. He received an excellent education in Constantinople, was adopted by his uncle Justin I, who was emperor from 518 to 527, and succeeded Justin as emperor. Justinian was said to be somewhat cold and ascetic in temperament, simple in manners, abstemious in habits. He loved order and system, hated idleness, and could work long stretches with little sleep. Much of his success Justinian owed to his brilliant wife Theodora, who had been a popular actress. She had great influence over him both in religious and political matters and wielded vast power. Wilful and strong, she demanded obeisance from all who thronged her splendid court, and sent out spies to track down those who opposed her. When Justinian would have fled during an insurrection, her firmness kept him on his throne and suppressed the rebellion. (See also Byzantine Empire.)

JUTE. The gunny sack that holds your potatoes and sugar was once a mass of silky fibers in the stalks of jute plants growing in a hot, moist field. These plants—whose native name is *pat*—thrive best in the double delta of the Ganges and Brahmaputra rivers, for the monsoon rains bring them moisture when they need it most, and the rivers carry them a fresh supply of nourishing soil at each flood time.

India has almost a monopoly on the world's jute, though some grows in China and Siam. Throngs of dark-skinned workers sow the *pat* seed in the spring, weed and thin the growing plants, and harvest them after they have grown tall and borne their yellowish flowers. Then they throw the plants in bundles into pools or creeks to ferment, or *ret*. When the stalks have softened, the skilful laborers wade into the pool and separate the fibers from the stalk. One hundred pounds of *pat* will yield only about five pounds of the fiber. After being dried in the hot sun, the long fiber goes into great bales to be carried to market in rumbling ox-carts. Some of it goes to other lands for manufacture, but the most is spun and woven in Calcutta's many mills.

The gunny sack is, perhaps, the most familiar use of jute, but the fiber goes into an increasing list of other products. It makes rope, cord, and twine. It takes dye readily and is woven into fiber carpets and curtains. Sometimes it is mixed with other fibers to make special cloths. Jute burlap is made in many grades from coarse bagging and wrapping material to finer wall coverings, upholstering, and linings for clothing. Linoleum has a jute backing. Tarpaulin is often made from jute, as is furniture webbing.

Compared with hemp, manila, sisal, or ramie fibers, jute is inferior in strength, tenacity, and durability, but because of its low price and adaptability it holds its important place in the manufacturing world.

Jute plants are annuals growing from seed. Scientific names, *Corchorus olitorius* and *Corchorus capsularis*.

JUVENILE COURTS. The purpose of the juvenile court is to act as a sort of "big brother" to boys and girls who break the law, to show them the folly of rebelling against the regulations of society, to see that they have the right sort of home surroundings, and to check them before they become confirmed criminals. Although the system varies widely in different states, its general working plan is about like this:

The unruly boy or girl is taken before the juvenile court judge, after the facts have been investigated by some officer of the court. The judge talks in a friendly way to the offender and tries to find out what led to the crime or misbehavior. If it is a first offense, the boy or girl is usually "put on probation." This means that the offender must report each week or each month to a probation officer, who keeps a record of the child's activities, consults with the parents and the teacher or employer, and tries to keep the child on the right path. Experts estimate that the probation service costs about one-twentieth as much as commitment to prison, and it saves four-fifths of the children who appear in the courts.

All this special work with children is done on the theory that the average boy or girl, given a chance, wants to be a useful and respected citizen, that no child is born wicked, and that he will usually make good if he is put on his honor. Society, moreover, now assumes a liability for children brought up under improper surroundings for which they are not responsible. Many other experiments along the same lines have justified this faith in children (see George Junior Republic).

In 1869 the city of Boston started separate sessions of court for juvenile offenders, but the first court entirely for children was not established until 1899 in Chicago, by Judge Richard Tuthill. The next year, 1900, Denver opened its juvenile court, under Ben B. Lindsey, a pioneer in the movement to have all cases involving children brought before a special court. Judge Lindsey served for 27 years, and by his writings and speeches no less than by his advanced methods in handling delinquent and criminal children, made himself a national figure. He was one of the first to use a woman as assistant judge to deal with girl offenders. The Boston juvenile court was established in 1906, and under Judge Frederick P. Cabot, a distinguished lawyer and public-spirited citizen, became one of the best in the country. The first woman to serve as juvenile judge was Miss Mary M. Bartelme, elected in Chicago in 1927. Juvenile courts now exist in nearly all states.

THE EASY REFERENCE FACT-INDEX

GUIDE TO ALL VOLUMES FOR SUBJECTS
BEGINNING WITH

I-J

TO SAVE TIME

USE THIS INDEX 

EDITOR'S NOTE ON NEXT PAGE TELLS WHY

SPECIAL LISTS AND TABLES

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Numerous other lists and tables in the fields of geography, history, literature, science, mathematics, and other departments of knowledge will be found with their appropriate articles in the main text

EDITOR'S NOTE

EVERY user of Compton's Pictured Encyclopedia should form the habit of *first* turning to the Fact-Index section at the end of each volume when in search of specific information. This index is a miniature work of reference in itself and will often give you directly the facts, dates, or definitions you seek. Even when you want full treatment of a subject, you will usually save time by finding in the index the exact page numbers for the desired material.

All page numbers are preceded by a letter of the alphabet, as A-23. The letter indicates the volume. If two or three page numbers are given for the topic you are seeking, the first indicates the more general and important treatment; the second and third point to additional information on other pages. Where necessary, subheadings follow the entry and tell you by guide words or phrases where the various aspects of the subject are treated.

The arrangement of subheadings is alphabetical, except in major historical and biographical entries. In these the chronological order is followed.

The pictures illustrating a specific subject as a rule appear on the same pages as the text to which you are referred. But often illustrations placed elsewhere will prove of additional interest and value. These are indicated by the word *picture* followed by a page number.

A picture reference is frequently intended to call attention to details in the text under the illustration as well as to the illustration itself. This picture-text, therefore, should always be carefully read.

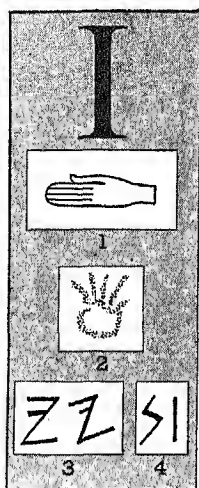
The pronunciations given are those preferred by the best and most recent authorities; alternative pronunciations are indicated only where usage is equally divided. For foreign names the native pronunciation is given except where the English pronunciation has become thoroughly established, as in "Paris," "Barcelona," "Seine."

In recent years hundreds of foreign geographical names have been changed, either officially or by custom. Both old and new names are given at the appropriate places in the alphabet.

Populations are given in round numbers, except for places in the United States and Canada, where the figures are those of the latest official census. Distances between points are map or air distances, not distances by railroad.

THE EASY REFERENCE FACT-INDEX

Reg. U. S. Pat. Off.



OUR LETTER I probably started in Egyptian writing as a picture of a hand with the fingers indicated (1). Soon after 2000 B.C., a Semitic people called the Scrites adopted it as an alphabetic sign for a 'y' sound, because their word *yad* or *yod* for 'hand' began with this sound. For the sign, they made a crude hand (2). The Canaanite-Phoenician alphabet simplified the sign drastically (3); in Hebrew it was called *yod*.

When the Greeks learned to write from the Phoenicians, they did not want a sign for the 'y' sound. They did want a sign, however, for the vowel sound of 'i', which is much like the sound of 'y'. Therefore, the Greeks used the *yod* sign for I and renamed it *iota*.

Another change came when the Greeks reversed the Semitic style of writing from right to left, and turned the *yod* sign around. They also simplified it into a single stroke (4).

The Romans took the *iota* sign into Latin, and from Latin the sign came without change into English. Our small handwritten or printed 'i' is the same as the capital except for a bottom curve which the hand tends to make in writing, and for a dot. The dot was added in medieval times to distinguish the letter from similar ones, such as a hastily written small 'c'.

NOTE.—For the story of how alphabetic writing began and developed, see the articles Alphabet; Writing.

I, a personal pronoun correct use of P-352

Iago (*ē-ā-gō*), villain in Shakespeare's *Othello* O-253-4

'I Am an American' Day H-322

Iambic meter, in poetry P-269

Ian Hay. See in *Index* Belith, John Hay

Iapetus (*i-āp-ē-tūs*), in Greek mythology, one of the Titans; son of Uranus and Gaea; father of Atlas and Prometheus; thrown into Tartarus for rebelling against Zeus.

Iasi, Rumania. See in *Index* Jassy

Iatrochemistry, chemistry applied to medicine C-178

Ibagué (*ē-bā-gā*), Colombia, or San Bonifacio de Ibagué, commercial center 75 mi. w. of Bogotá; pop. 76,000; coffee, gold; map C-305

Ibáñez (*ē-bā-nē-yāth*), Vicente Blasco (1867-1928), Spanish novelist I-1, V-269, picture S-237

Ibans (*i-bānz*), natives of Borneo B-198

I-beam, in architecture A-273

Iberia (*i-bē-ri-ā*), ancient district between Caucasus Mts. and Armenia, now part of Georgia; also ancient name of Spain.

Iberian Peninsula, in s.w. Europe E-318, maps E-318a, S-226. See also in *Index* Portugal; Spain

Iberian people, ancient race, ancestors of modern Basques France F-171, 172 Spain S-227

Iberis (*i-bē-ris*). See in *Index* Candy-tuft

Ibero-American Exposition (1929), at Seville, Spain F-5, picture F-5

Iberville (*ē-bēr-vēl'*), Pierre le Moyne, Sieur d' (1661-1706), French-Canadian explorer and naval and military commander K-23 founds Louisiana L-208

Ibex, a type of mountain goat I-1 Asiatic E-348

Ibbs, a wading bird sacred ibis S-298, picture S-295 wood ibis S-294

Ibiza (*ē-bē-thā*), also Iviza, one of Balearic Islands B-17, map S-228

Ibn Saud (*ē-bn sād-qā'*) (born 1881), King of Saudi Arabia; former title, King of Hejaz and Nejd; excellent warrior and statesman; united central Arabia into strong and mod-

ernized state; improved roads, increased motor transportation, advanced agriculture, increased state revenues, etc.: A-237, 238, 240-1 Pan-Arab movement A-242 takes Mecca M-103

Ibn Sina. See in *Index* Avicenna

Ibo (*ē-bō*), or Igbo, an important Negro tribe dwelling along the lower Niger River; formerly exported as slaves in large numbers; strong, industrious, peaceful.

Ibrahim Pasha (*ib-rū-hēm' pā-shū'*) (1789-1848), Egyptian general and viceroy; commander (1826-28) in Greek war for independence.

Ib'sen, Henrik (1828-1906), Norwegian dramatist I-2, D-98 Björnson contrasted with B-152

"I came, I saw, I conquered" C-12

Icarus, island. See *Nicarua*

Icarus (*ik'ā-rūs*), in Greek mythology, son of Daedalus D-1

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Ice Barrier, Great, or Ross Shelf Ice, in Antarctic region A-214, P-283, map A-215, picture A-217

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Ice hockey H-314, picture W-117

Iceland, island of n. Atlantic; 40,000

sq. mi.; pop. 120,000; cap. Reykjavik:

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altitude, influence on vegetation and

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United States occupation I-6, W-178c

Icelandic literature I-5b

Iceland moss, a lichen L-122

Iceland poppy, a perennial plant

(*Papaver nudicaule*) of the poppy

family, native to Arctic regions.

Has thick cluster of white-hairy

leaves; flowers sweet scented, with

yellow, white, orange, or scarlet

petals: G-11

Iceland spar, transparent calcite I-6,

C-19

double refraction picture L-131

light polarized by L-130

Ice-plant, a fleshy, watery herb

(*Mesembryanthemum crystallinum*)

of the fig marigold genus

with greenish or reddish foliage

appearing as if frosted with par-

ticles of ice which glitter in the sun.

Ichabod (*ik'ā-bōd*) Crane, in Wash-

ington Irving's *Legend of Sleepy*

Hollow', a lank grotesque country

schoolmaster, sultor of Katrina

Van Tassel I-151

Ichneumon (*ik-nū'mōn*), a weasel-

like mammal I-6

Indian, or mongoose M-224

Ichneumon fly I-6

egg-laying habits I-8, picture I-89

Ichthyology (*ik-thī-ōl'ō-jī*), the

branch of zoology that deals with

fishes. See in *Index* Fish

Ichthyornis (*ik-thī-ōr'nīs*), prehistoric

toothed sea bird; somewhat re-

sembling tern but with long skull

retaining some reptilian features.

Ichthyosaur (*ik-thī-ō-sgr*), a prehis-

toric aquatic reptile A-208

Ichu (*ē'chq*), a perennial bunch grass

(*Stipa ichu*) found on plateaus of

Andes Mts. Used by Indians for fuel and to thatch their houses and as forage for livestock.

Ickes (ik'is), Harold L. (born 1874), politician, born Blair Co., Pa.; Sec'y of Interior F. D. Roosevelt's cabinet, also administrator of public works and petroleum administrator and sold fuels administrator for war ("The New Democracy").

Ickornshaw, Viscount of. See Snowden, Philip

Icolmkill. See in Index Iona

Icon (i'kōn), also Ikon, or Eikon, an image; in the Greek church, a venerated image of Christ, the Virgin, or a saint.

Iconium (i-kō'nī-um). See Konya

Iconoclast (i-kōn'ō-klast), literally an image-breaker; in church history, 8th-9th centuries, member of Byzantine party opposed to use of images in worship; today, one who shatters tradition: B-290

Iconoscope, in television T-41

Icteridae (ik-tēr'i-dē), family name of bobolinks, orioles, blackbirds.

Ictinus (ik-tī'nūs) (5th century B.C.), Greek architect, designer of the Parthenon

Icy Cape, Alaska, in Arctic Ocean, 150 mi. s.e. of Point Barrow.

Ida, a mountain range of Asia Minor, 30 mi. s.e. of plain of Troy T-143

Ida, Mount, Crete, now called Psiloriti; fabled birthplace of Zeus: C-394

Idaho, one of the n.w. states of U. S.; 83,557 sq. mi.; pop. 524,873; cap. Boise: 1-7-11, maps I-8, U-1880

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name, origin, and nickname I-7, S-279

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water power I-7

Idaho, College of, at Caldwell, Idaho; founded 1891, by Presbyterian church; arts and sciences.

Idaho, University of, state institution at Moscow, Idaho; opened 1892 (established 1889); classics, science, forestry, home economics, education, engineering, agriculture, law, business: I-11

Idaho Falls, Idaho, agricultural center on Snake River, 50 mi. n.e. of Pocatello; pop. 15,024; market for potatoes; sugar mills: map I-8

Idaho Springs, Colo., mining and resort town in Clear Creek Cañon, 85 mi. w. of Denver; pop. 2112; hot mineral springs.

Idealists, in philosophy P-172, 173

Identification of criminals F-43

Ideograph, or Ideogram, a character used in ideographic writing. See below

Ideographic (i-dē-ō-grā'fik or id-ē-ō-grā'fik) writing, picture writing representing ideas W-184, 185, A-134-134a. See also in Index Hieroglyphics; Picture writing Chinese C-221f

Japanese J-191, J-199, pictures J-199

Ides (idz), in the Roman calendar, name given to 15th day of March, May, July, and October, and to 13th of all other months: C-22

Caesar and "Ides of March" C-12-13

Id'fu, Egypt, also Edfu, ancient town on Nile, 54 mi. s.e. of Thebes

Temple of Horus (3d century, B.C.) picture A-258

Idiocy, mental deficiency M-117

Idiom (id'i-um), a form of expression characteristic of a particular language; approved by usage, but often not grammatical or logical.

Idol, image of a god to which worship is offered; took different forms in different countries; usually man, sometimes beast.

Iduna (ē-dū'nā), also Idun, in Norse mythology, goddess of youth and spring: S-37-8

Idyl, or idyll, originally, a short poem presenting simple scenes of pastoral or rustic life; extended to include any descriptive or narrative poem of elevated and artistic style.

"Idylls of the King", series of poems by Tennyson based on legends of King Arthur and his knights T-52 quoted R-162

origin of legends A-315, R-160, G-1

Ieper, Belgium. See in Index Ypres

"I fear the Greeks, even bearing gifts" T-144

"If I have faltered more or less," poem by Stevenson S-287

Ifni (ēf'nē), Spanish possession on s.w. coast of Morocco; 965 sq. mi.; pop. 20,000: map A-42a

Igbo (ēg'bō). See in Index Ibo

Iglou (ig'lo), Eskimo hut E-301-2, S-111, pictures E-301, S-112

snow poor heat conductor S-174

Ignatius, Saint, bishop of Antioch. Apostolic Father. Legend says he was disciple of the Apostle John and was martyred in Rome; famed for epistles to various congregations (about 110-117); festival Feb. 1.

Ignatius of Loyola. See in Index Loyola, Ignatius de

Igneous (ig'nē-ūs) rocks G-39, M-184, R-121

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Ignis Fatuus (ig'nīs fāt'yū-ūs), will-o'-the-wisp W-104b

Ignition, in gas engines G-20-1

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Ignition point, temperature at which a substance will catch fire F-45-6

Igorots (ē-gō-rōts'), mountain tribes of Philippines P-165-6, picture P-186

Iguana (i-gwā'nā), a lizard of the family Iguanidae I-11

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foot, picture F-147

horned toad L-171-2

rhinoceros iguana, picture L-170

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Iguanodon, a prehistoric reptile A-206

Iguassú (ē-gwā-sū'), also Iguazú, Falls, of the Iguassú River; national park: A-289a, map B-226, picture S-208g

Iguassú River, in s. Brazil; rises near Atlantic, flows w. 800 mi. to Paraná River; separates Brazil and Argentina: map B-226

I Ho Ch'uan, secret society of China C-221f

Ijssel Lake, Holland. See in Index Zuider Zee

Ikhnenaton, or Akhenaton (Amenhotep IV) (reigned about 1367-1350 B.C.), Egyptian king of the XVIIIth dynasty, son of Amenhotep III: E-209-10

queen, picture A-250

Ikhwan (ik-wā'n'), Mohammedan religious sect A-240

Ikon (i'kōn), also Ieon, or Eikon, an image; in the Greek church, a venerated image of Christ, the Virgin, or a saint.

Île de France (ēl dū frāns), French name of Mauritius M-61

dodo, extinct bird native to D-75

Plex, a tree or shrub of the holly family (Ilexaceae).

"Iliad, The", Greek epic poem of Trojan War II-329-30

Achilles A-8-9; Athena and Diomedes A-352; Hector H-268-9; Trojan War T-142-3

Ilije (ēl'yēch), name of three Serbian writers: Jovan (1823-1901), a poet; his sons, Dragutin (born 1858), critic and poet; and Voyislav (1882-94), a poet strongly influenced by Pushkin.

Il'um, ancient Greek name of Troy. See in Index Troy

Ilium, upper portion of hip-bone S-158, picture S-156

Ikhnan (ēl-kā'n'), Mongol dynasty of Persia (1256-1353)

Ilimpu, Mount. See in Index Sorata

Ilimani (ē-yē-mā'nē), volcanic peak of Andes in Bolivia, about 80 mi. s.e. of La Paz; 21,024 ft.

Illium, a "rare earth" chemical element, resembling cerium C-167, 168

discoverer, picture C-175

Illinois (il-i-noi'), a central state of U.S.; 58,400 sq. mi.; pop. 7,897,241; cap. Springfield: I-12-18, maps I-13, U-188c

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Johnny Appleseed A-232

Black Hawk War I-68

Mormon settlement M-258

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minerals I-14-15; coal I-12, picture C-285

name, origin, and nickname S-279

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products: chart I-13, list I-12

social welfare I-18, P-118

Illinois, University of, at Urbana, Ill.; state control; founded 1867 (opened 1868); arts and sciences, engineering, commerce, journalism, education, fine arts, agriculture, library school, music, law, pharmacy,

dentistry, and medicine; State Laboratory of Natural History; State Geological Survey
 football strategy P-1517
 former "land grant" college E-182
Illinois and Michigan Canal I-15, C-193
Illinois and Mississippi Canal. See in *Index* Hennepin Canal
Illinoisan ice sheet I-2b
Illinois College, Presbyterian institution at Jacksonville, Ill.; founded 1829; liberal arts, music.
Illinois Indians, an Algonquian confederacy comprising the Cahokia, Kaskaskia, Michigamea, Moingwena, Peoria, and Tamaroa, formerly living in Wisconsin, Illinois, and parts of Iowa and Missouri. A few Kaskaskia and Peoria survive in Oklahoma. The name is French form of the native name *ilini*, "man" (plural *iliniwek*) perished at Starved Rock I-13
Illinois Institute of Technology, at Chicago, Ill.; established 1940 when Armour Institute of Technology (founded 1892) and Lewis Institute (founded 1898) were merged; engineering, architecture, industrial arts, sciences, art, business.
Illinois River, chief river of Illinois; flows 433 mi. s.w. to Mississippi River I-12, I-15-18, map I-13
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Chicago Drainage Canal I-16, C-69, C-189
Hennepin H-274; La Salle L-66, 67; Marquette M-67
Starved Rock I-12, picture I-14
Illinois Waterway C-69, G-149, I-15-16, map G-148a
Illinois Wesleyan University, at Bloomington, Ill.; M. E.; founded 1850; liberal arts, home economics, fine arts, music, oratory.
Illinois Woman's College. See in *Index* MacMurray College
Illiteracy P-304d
 ancient Jews reduced E-167
 Argentina A-280d
 Bolivia B-170
 Brazil B-226o
 Central America C-133a
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 Estonia E-306
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 Russia E-187
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 United States P-304d; bar to immigration I-23; lowest in Iowa I-120; Negroes N-62; reduction E-182
 Uruguay U-262
 Venezuela V-276
Il (el) River, in Alsace-Lorraine, France; rises in Jura Mts. s.w. of Basel and flows n.e. parallel with Rhine, which it enters at Strasbourg; about 123 mi. long.
Illuminated manuscripts and books B-178, 180, pictures B-178, 179 color plates B-178a-b, 178a-b
Illuminating gas G-22-3. See also in *Index* Gas, for heating and lighting
Illumination L-56-9. See also in *Index* Lighting
Illusions I-19-20
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 hypnotism II-377
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 weight and size I-20

Illustrated books, for children L-107-8, L-157
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Illustration of books. See also in *Index* Engraving and etching
 children's literature L-107-9, L-157-64
 illuminated manuscripts B-178, 180, pictures B-178, 179, color plates B-178a-b, 178a-b
 woodcuts in early printing B-180
Iluviation, zone of, in soil S-191b
Illyria (Illyria), ancient name of district bordering east coast of Adriatic Sea n. of Epirus; land boundary indefinite, but region extended eastward perhaps as far as present Danube River: map G-154
Illyrians, ancestors of modern Albanians A-107, B-17
Ilmenite, an ore containing oxides of iron and titanium M-182, P-32
Iloilo (Iloilo), Philippines, seaport on Panay Island; pop. 91,000; important commercially, especially for sugar; natives actively hostile during annexation by United States in 1899: maps A-332c, P-10b
'Il Penseroso' (el pen-sā-rō'sō) ("the pensive man"), ode by Milton to "divinest Melancholy," celebrating peace, leisure, contemplation.
'Il Trovatore' (el trō-vā-tō'rā), opera by Verdi V-282
 story O-234
Image, optical
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 microscopic M-156
 photographic P-180-2, P-185
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 television and telephotography T-41-2
 virtual, picture L-126
Imagery, power of, necessary in writing W-186
Imagination I-20
 influence of good books L-108
 play materials stimulate P-258
'Imagination', a Little Talk by Arthur Mee I-21
Imagism, movement in 20th-century poetry which aimed to present hard, clear-cut images and sense impressions instead of vague abstractions and sentimentalities; influenced by Japanese poetry
 American poetry A-182
Imago (i-mā'gō), mature insect I-86
Imari ware, or Hizen ware, a fine Japanese porcelain J-200
Imbecility, a degree of mental deficiency M-117
Imbros (im'brōs), Greek island in Aegean Sea, near Dardanelles; 87 sq. mi.; ancient Greek colony, later Turkish possession: maps A-25, B-18
Immaculate College, at Immaculata, Pa.; Roman Catholic institution for women, founded 1920; arts and sciences, music.
Immaculate Conception, festival of the Christian church, December 8.
'Immaculate Conception', painting by Murillo M-304, picture M-303
Immaculate Conception, dogma of, a doctrine of the Roman Catholic Church which maintains that the Virgin Mary, the Mother of Jesus, was conceived without original sin doctrine established by Pius IX P-227
Immaculata Heart College, at Hollywood, Calif.; Roman Catholic institution for women, founded 1920; arts and sciences.
Immanuel (i-mā'nū-yū-ēl), or Emmanuel, the divinely appointed deliverer

foretold by Isaiah (vii, 14) and recognized by the evangelist in Jesus; "they shall call his name Emmanuel, which being interpreted is God with us"—Matt. I, 23.
Immelmann, in aviation, a maneuver in which plane makes a half loop upward into inverted position and then rights itself with a half roll. Because of the great strain on the wings, this maneuver is generally done only in an especially braced ship. Named for German "ace" who invented it as a fighting maneuver during 1st World War.
Immigration, entrance into a country for permanent residence, the opposite of emigration I-22-4. See also in *Index* Americanization; Citizenship; Emigration; migration of peoples; Naturalization
Americanization A-175
Australia A-370, 373, I-24
Canada C-56, 59-60; Asiatics restricted V-295
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Japanese and Chinese Exclusion
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Immortality
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 Greek idea of H-194
 man who refused, myth B-9
Immortals, Forty, members of the French Academy A-4
Immortelle (im-ōr-tēl'), plant with "everlasting" flowers I-26
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 antitoxins A-223
 effect of H-254, pictograph H-255
 feudal times F-28-9
 vaccination V-267
Impatiens (im-pā'shē-ēnz), or touch-me-not, a genus of succulent annual and perennial plants of the balsam family; includes garden balsam (I. balsamina), jewel-weeds (I. pallida and I. biflora), and several other species used as house plants and called "patience"; some yield red, yellow, or black dyes.
Impeachment, of civil officers I-26-7, U-215. For list of federal impeachments see table on next page
 accusation by House of Representatives U-212; trial by Senate U-213
Hastings H-234
Johnson, president of U. S. J-224

ü=French u, German ü; gem. /o; thin, thin; ñ=French nasal (Jean); zh=French j (z in azure); x=German guttural oh

FEDERAL IMPEACHMENTS

NAME	OFFICE	IMPEACHED BY HOUSE	CHARGE	TRIED BY SENATE	DECISION
William Blount	Senator from Tennessee	1797	Treason and sedition	1796-99	Expelled from Senate; case dismissed
John Pickering	District Judge, New Hampshire	1803	Inebriety, profanity on bench	1804	Removed
Samuel Chase	Supreme Court Justice	1804	Political bias in decisions	1805	Acquitted
James H. Peck	District Judge, Missouri	1830	Abuse of official power	1831	Acquitted
West Hughes Humphreys	District Judge, Tennessee	1862	Supporting secession	1862	Removed
Andrew Johnson	President	1868	Violating Tenure of Office Act	1868	Acquitted
William Worth Belknap	Secretary of War	1876	Accepting appointment bribe	1876	Acquitted
Charles Swayne	District Judge, Florida	1904	Misuse of authority	1905	Acquitted
Robert W. Archbald	Judge, U. S. Commerce Court	1912	Misuse of power for own gain	1913	Removed
George W. English	District Judge, Illinois	1926	Misuse of power for own gain	Resigned; case dropped
Harold Londerback	District Judge, California	1933	Misuse of power for own gain	1933	Acquitted
Halsted L. Ritter	District Judge, Florida	1936	Accepting fees or gratuities	1936	Removed

Imperative mode, of verb V-281, S-79
Impera'tor, Roman title of honor
Augustus A-364

Imperial, size of paper B-161

Imperial bushel W-66

Imperial Conference, assembly held every four years by representatives of self-governing members of British Empire; first held 1887 as "Colonial Conference"; title changed 1907; purpose is to coördinate economic problems and to gain greater political freedom for the Dominions.

Imperial gallon W-67

Imperialism, in politics, policy of national territorial expansion

British Empire B-247-8

Disraeli D-71

French policy F-178

German tendencies G-73

Japan J-191b-2

United States U-246, P-9: McKinley administration M-15-16; Wilson opposes W-108

Imperial Valley, in s. California, formerly part of Colorado Desert; area about 4400 sq. mi.; mostly below sea level; chief cities El Centro, Calexico, Bravley, Imperial City: C-28-9, 30, D-16, map C-26

Implements T-108-12. See also in Index Tools

"Implied powers," in U. S. Constitution U-212

Imports. See in Index Exports and imports

Imp'ost, in architecture, diagram A-249

Impounding dam, or storage dam D-6b

Impressionism, in art

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color reactions C-308/

examples: 'At the Piano' by Whistler, picture P-25; 'Hitching Oxen to the Boat' by Sorolla, picture P-24; 'La Grenouillère', by Monet, picture P-25

Japanese influence J-202

sculpture S-61-2

Impressment, of American seamen

one cause of War of 1812 W-8

Impulse turbines T-158

Impulsive acts, in psychology W-96, 99

Impurities, in water W-45-6

Imu (ēmg) pit, for outdoor cooking, picture C-47a

Inaccessible Island, in Atlantic Ocean A-356

Inauguration Day, day on which the president of the United States is inaugurated; now January 20 of the years following a presidential election; before 1984, March 4 in

such years; a holiday in the District of Columbia

20th amendment U-216

Inboard motor boats B-165

Incandescence, the state of emitting light because of intense heat; may or may not be accompanied by combustion; common examples, a flame, glowing iron, filament of electric lamp. See in Index Electric lighting

Incantations, magic words M-30

Incarinate Word College, at San Antonio, Tex.; Roman Catholic institution for women, founded 1881; arts and sciences, music, home economics, nursing.

Incarvillea (in-kār-vil'ē-ā), a genus of annual or perennial plants of the bignonia family, native to western China and Tibet. Leaves finely cut, or with margins toothed; flowers tube-shaped, in clusters, red or yellow; sometimes called hardy gloxinia.

Incas (ing'kās), ancient South American Indian race I-27, S-208c, 208f

civilization A-148

domesticated llamas L-173

Great Wall of Peru S-208c, picture S-205d

mummies C-360

Pizarro conquers P-226

remains of cities, pictures S-206c, I-27

In'cense, an aromatic mixture which yields a pleasing perfume when burning

spices and resins P-124, S-249

Incense cedar, evergreen tree (*Libocedrus decurrens*) of pine family, native to Pacific coast; grows 60 to 110 ft., may live to 500 yrs.; pyramid-shaped with tapering trunk; bark shreddy, cinnamon colored, and usually riddled by a fungus; sometimes called California incense cedar. Wood soft, white with a peppery odor, and takes high polish; occasional fungus spots do not affect lasting quality; used as substitute for eastern red cedar in pencils, and for fence posts, mothproof chests, and railroad ties.

Inch, twelfth part of a foot W-86

Inchcape, James Lyle Mackay, first Earl (1852-1932), British shipowner; president Shipping Federation 1926; served on most government commissions of inquiry in both India and England.

Inchcape Rock. See in Index Bell Rock

Inch worm, or cankerworm C-72

Incidence, angle of L-126

Incident beam of light, in light experiments L-126

Incipit (in-sip'it), of a manuscript B-161

Inel'sor teeth T-26, pictures T-29

Inclination of an orbit, in astronomy, the angle between the plane of a heavenly body's orbit and the plane of the ecliptic or Earth's orbit

Inclined plane M-103, 104, 105, pictures M-106

building pyramids, picture P-371

Inclino'meter, banking indicator of an airplane A-76

Income, in economics E-153

farmer's source of income, chart U-192

household budget H-326

machine age increases L-93a-b

national, United States U-198, N-12q

Income tax I-27

Great Britain I-27

United States T-17, N-12q

authorized by 16th amendment U-211; text U-218

2d World War R-146p, N-12q

In'crement, unearned T-18

Incuba'tion, the process of bringing about the hatching of eggs, or the period between the time an egg is laid and the time it hatches E-192

birds B-128

chickens P-337-8

fish F-76, picture F-77

In'cubator, apparatus for artificial hatching of eggs P-337-8

In'cunabula (in-kū-nāb'yū-lā), 15th century printing T-173-4

In'cus ("anvil"), bone of middle ear E-126, S-156, diagram E-127

Indem'nity, protection against or compensation for loss or damage; especially, compensation paid by defeated power after war

Boxer Rebellion C-221f

Franco-Prussian War F-166

German, after World War. See in Index Reparations

Poland (from Russia) W-175

Russian, after Treaty of Brest-Litovsk L-160

Inden'tured servants, in American colonies A-151, 157, 166

Independence, Kan., industrial city 143 mi. s.w. of Kansas City, Mo., on Verdigris River; pop. 11,565; center of agricultural, gas, and oil region; cement, time bombs, revolving doors: map K-4

Independence, Mo., residential suburb of Kansas City, with stock-breeding and fruit-growing interests: pop. 16,066; scene of two Civil War battles: map M-208

beginning of Oregon trail F-16

Mormons M-256, 259

Independence Day

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 Independence Hall, Philadelphia, P-158-9, *picture* P-159
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 Liberty Bell D-29, *picture* D-28
 reproduced by Ford F-153
 Independent Order of Foresters. *See in Index* Foresters
 Independent Order of Odd Fellows. *See in Index* Odd Fellows
 Independents, or Separatists P-369
 found Plymouth Colony M-91-4
 Indeterminate sentence, for crime P-350
 Index, in Roman Catholic church. list of prohibited books (*Index Librorum Prohibitorum*) P-348
 Index, book, beginnings B-181
 Index, copula'tic, or cranial R-10
 Index, periodical, how to use M-26
 Index numbers, in statistics G-136h-j
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 India, the central of three peninsulas in s. part of Asia; 1,575,300 sq. mi.; pop. over 350,000,000; cap. Delhi: I-28-44, *maps* I-30, 31, A-332a, b-c. *Outline* I-43-4. *See also in Index* Bengal; Cashmere; Hyderabad; Madras; also Burma, formerly part of India
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 Jain temple, *picture* A-329
 Kuth Minar tower, *picture* D-42
 Mosque of Shah Jehan, *picture* D-43
 Mysore palace A-331
 Pagoda at Tanjore, *picture* I-39
 palace in Lake Pichola, *picture* I-41
 Pearl Mosque at Delhi D-43
 Taj Mahal T-4-6, *picture* T-5
 tomb at Agra, *picture* I-43
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 Alexander's invasion I-38, A-115
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 East India Company I-38-40
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 Afghan wars A-31
 Mutiny of 1857 I-39; Delhi D-44; Lucknow L-211
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 India, Portuguese. *See in Index* Portuguese India
 India hemp. *See in Index* Sunn
 India ink I-79
 colloidal in solution C-303
 India linen, fine, closely woven white cotton fabric. *Linen* is French for "lawn."

Indiana, a central state of United States; 36,291 sq. mi.; pop. 3,427,796; cap. Indianapolis I-45-50, *maps* I-46, U-188a
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 Indiana, Pa., city 46 mi. n.e. of Pittsburgh; pop. 10,050; founded in 1805 by George Clymer, signer of Declaration of Independence; hosiery, lumber; state teachers college.
 Indian Affairs, Office of U-230, I-67
 Alaskan welfare work A-106
 education S-40
 wilderness areas N-22f
 Indiana limestone, or Bedford limestone L-138, Q-3, *picture* I-49
 Indian antelope, *picture* A-219
 Indianapolis, Ind., capital and largest city of state; pop. 386,972: I-50-1, *map* I-46, *picture* I-49
 National Pike R-112, I-48
 Indian Archipelago E-141-3. *See also in Index* East Indies
 Indiana State University, at Bloomington, Ind., opened 1824 as Indiana Seminary (established 1820); made university 1838; arts and sciences, education, law, medicine (one year), commerce and finance, music, and graduate school; schools of medicine, dentistry, and nursing at Indianapolis: *picture* I-49
 Indiana Territory I-45
 Indian buffalo B-261
 Indian cobra C-291
 Indian corn, origin of name C-368
 Indian Day H-322
 Indian elephant E-244, 248, 249
 Indian Empire, Most Eminent Order of, British order of knighthood founded 1877; conferred for distinguished service in India.
 Indian Head, Md., town on Potomac River about 20 mi. s. of Washington, D. C.; pop. 1104; established 1892 as proving ground for naval ordnance; smokeless powder plant.
 Indian hemp, a common name for the hemp dogbane (*Apocynum cannabinum*), a source for hashish.
 Indian leaf butterfly, also called oriental leaf butterfly, dead leaf butterfly, or kallima P-354, *pictures* P-355, I-85
 Indian mallow, or velvet leaf, an annual plant (*Abutilon theophrasti*) of mallow family, native to s. Asia but naturalized in North America. Grows to 5 ft.; leaves velvety, heart-shaped, 4 in. to 12 in. wide. Flower yellow, with 5 petals; sometimes called butter print, buttonweed, and pie marker.

ü=French u, German ü; gem. ðo; thin, then; ñ=French nasal (Jean); zh=French j (z in azure); κ=German guttural ch

Indian millet, term loosely given to certain non-saccharine sorghums, such as kafir, millet, and sorghum.

Indian mounds M-291, A-147, *picture* A-149

Indian Mutiny (Sepoy Rebellion). of 1857 I-39

Delhi D-44

Lucknow sieges L-211

Indian National Congress G-5, I-40

Indian Ocean, the third largest ocean I-51, *maps* A-332a, c, B-142-3. See also in *Index* Ocean, *table*

Indianola, Iowa, commercial center 18 mi. s. of Des Moines; pop. 4123; Simpson College.

Indian paint brush, or painted cup, a plant (*Castilleja coccinea*) of the figwort family, the beauty of which is due, not to its flowers, but to its lemon-yellow or scarlet floral leaves; the plant is partly parasitic on the roots of other plants; Wyoming state flower.

Indian pipe, or ghost flower, a plant, *picture* F-218

Indian pony, or mustang H-342, 344, *picture* A-52

Indian Reorganization Act I-67

Indian reservations. See in *Index* Indians, North American, *subhead* reservations

Indian rhinoceros R-94

Indian rice. See in *Index* Wild rice

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Tierra del Fuego S-208, 208c, *picture* S-205f

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Indian shot, or canna C-72-3

Indian summer, a short period of mild weather with clear skies and hazy atmosphere along the horizon, occurring after a period of cold weather. It usually comes in October or November, but is not a fixed season and may come as early as September or as late as December or may be intermittent. In Europe

- It is known as St. Martin's summer, St. Luke's summer, or St. Michael's summer.
- Indian Territory**, former territory of U. S.; reserved for Indians previously living east of Mississippi River; until 1889 co-extensive with present state of Oklahoma; 1889 to 1907 only eastern half reserved for Indians: O-215, 216, 219-20
Creeks transferred from Alabama I-68
- Indian tobacco**. *See in Index* Lobelia
- Indian trails** R-112
- India paper** P-61
- India prints** T-65, 66, 87, *picture* T-68
- India-rubber**, or rubber R-183-79.
See also in Index Rubber
- Indicative mode** V-281
- Indicators**, airplane A-76-8
- Indic languages**, subdivision of Indo-European group P-171
- Indictment**, in law, a formal written accusation presented by a grand jury to the court in which it has been sworn; an indictment is required in most states before a trial for felony.
- Indies**. *See in Index* East Indies; West Indies
- Indigestion**. *See in Index* Digestion
- Indigo**, a color
place in spectrum, *picture* S-241
- Indigo**, a plant I-71, D-121, 122
Colonial Louisiana produced L-204
- Indigo bird**, or indigo bunting B-273, F-35, *picture* F-35
- Indigo snake** S-172
- Indirect heating system** H-264
- Indirect lighting** E-235, L-58-9
diffuse reflection the basis L-128
- Indirect tax** T-18, 17
- Indium**, a silver-white metallic element, softer than lead, malleable, ductile, and crystalline; occurs in small deposits in zinc blend, tungsten, tin, and iron ores; discovered 1863 by means of spectroscopy; used in precious-metal alloys to increase resistance to corrosion: *table* C-168
- Individual differences** I-71-3
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intelligence tests I-99-7
used in anthropometry A-221
- Individualism**
fascist doctrine opposes F-18
socialist theories S-189-1, C-324d-25
- Indo-China**, formerly Farther India, the s.e. projection of Asia; includes French Indo-China, Burma, British Malaya, and Thailand: I-73-73d, *maps* I-73b, A-332a, *Outline* A-335.
See also in Index Burma; Malay Peninsula; Thailand
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- Indo-European peoples** P-171, C-248
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enter Greece G-154, 158; Italy R-128
first to tame horse H-342
invent wheel T-121
migrations of M-168
- Indole**, an organic chemical (C₈H₇N) obtained from coal tar
derivatives promote plant growth P-245a
- Indoor baseball** B-57
- Indoré** (*in-dor'*), a native state of cent. India; 9902 sq. mi.; pop. 1,325,099; cap. Indore (pop. 139,000): *map* A-332a
- Indorsement**, of a check C-393
- Indra** (*in'drā*), god of Vedic India; ruler of the heavens; in later mythology overshadowed by other gods.
- In'dri**, or babako'to, a lemur L-94
- Induced current**, in electric generators and motors E-218-18
- Inductance**, or self-induction, the opposition offered by an electrical circuit to current changes in it; arises from electromagnetic induction; a coil used to introduce inductance into a circuit is called "an inductance": E-229, 230
- radio R-18, 23; symbol for inductance R-24**
- Induction**, in philosophy P-172
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- Induction**, electromagnetic, interaction of electric and magnetic fields E-228-9
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electromagnets M-33-5
Faraday discovers F-12
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transformers T-119
- Induction**, electrostatic E-230, 231-2
- Induction**, magnetic, the physical process whereby a magnet or an electric current magnetizes near-by iron bodies M-34, 35, E-227
molecular nature E-228
- Induction coil**, a device for inducing alternating current from direct T-119, E-229
- Induction motor**, electric E-218
- Inductive coupling**, in radio R-21
- Indulgences**, in Roman Catholic church, remission of temporal punishment due to sins, after repentance has removed guilt: C-232
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Luther's theses on L-221
- In'dus River**, one of the chief rivers of India; 2000 mi. long: I-73d-4, I-31, *maps* I-30, A-332a, b-c
- Industrial arbitration** A-247. *See also in Index* Arbitration, industrial
- Industrial arts** I-75-8, *Outline* I-78-8.
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- American colonies** A-168-75
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- Industrial education** I-76, V-313-15, *Outline* I-78. *See also in Index* Agricultural education; Vocational education
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- Industrial management** I-74m-n
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ü=French u, German ü; gem, ðo; thin, then; ñ=French nasal (Jcañ); zh=French j (z in azure); k=German guttural oh

Indy (*dāh-dē'*), Vincent d' (1851-1931), French musical composer; pupil and follower of César Franck; one of founders and director of Schola Cantorum, world-famous music school; noted for rich and subtle instrumentation ('La Forêt Enchantée'; 'Wallenstein').

Inert gas C-167b, table C-168

Inertia, resistance of matter to change in its position or motion P-189
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electrical counterpart E-229
spring vibration period depends on E-230

Infallibil'ity, papal, doctrine of P-227

Infant. See in *Index* Baby care; Child care; Child development; Child training

Infan'te, and **Infan'ta**, titles of Spanish royal princes and princesses, respectively.

Infantile paralysis, an infectious disease G-80

'Infant Jesus Riding on a Lamb', painting by Blake, *picture* B-155

Inf'antry, in army A-307a, b, c
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Infection

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Infect'ious diseases G-78, 80. See also in *Index* Disease; Germ theory of disease

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parasitic W-180a-b, P-87, H-333

public health service H-254-7

vaccination V-267

Inferior maxilla. See in *Index* Mandible

Infer'no, in Dante's 'Divine Comedy' D-12

Infielder, in baseball B-56b

Inf'n'tive V-282

'In Flanders Fields', poem by John McCrae, quotations C-66, P-304

Inflation

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2d World War N-12n, p, r, R-146r

Infected languages P-171

Infection
characterizes Indo-European languages P-171

conjugation of verbs V-281-2

declension: nouns N-179; pronouns P-351-2

Inflorescence, the way in which flowers are borne; term often used to mean simply a flower-cluster. Type of inflorescence may vary as between the compact spike of the hyacinth and the flat cluster of the geranium.

Influen'za, virus disease G-78, H-254
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Information, a form of complaint in legal proceedings J-231

Infra-red rays R-14-15, H-261-2
glass that absorbs G-102
photography uses P-185

Infusoria P-357

Infusorial earth. See in *Index* Tripoli powder

In'galls, John James (1833-1900), American lawyer and politician, born Middleton, Mass.; leader in Kansas "free stato" movement;

U. S. senator from Kansas 1873-91; eloquent speaker.

Inge (*ing*), William Ralph (born 1860), English divine and writer; dean of St. Paul's Cathedral 1911-34; known as "the gloomy dean" because of denunciation of certain modern tendencies and pessimism; author of many published works.

Ingelow (*in'gē-lō*), Jean (1820-97), English poet and novelist ('High Tide on the Coast of Lincolnshire', poetry; 'Sarah de Berenger', novel).

Ingersoll, Jared (1722-81), American colonial official of Tory sympathies; born Milford, Conn.; London agent for Connecticut colony (1758-61, 1784); attacked as collector under Stamp Act of 1765 and forced to resign; Loyalist during Revolution.

Ingersoll, Robert Green (1833-99), American lawyer, author, and orator, born Dresden, N. Y.; served in Civil War; gained national fame as orator by "plumed knight" speech nominating Blaine for president in 1876; known as an agnostic for lectures and books against the Bible and Christianity.

Ingersoll, Royal E. (born 1883), naval officer, born Washington, D. C.; formerly assistant to chief of naval operations, made commander in chief of Atlantic Fleet, December 1941.

Ingersoll, Ontario, Canada, town on Thames River 18 mi. n.e. of London; pop. 5233; tools, furniture, shoes, cheese, condensed milk, flour, lumber products: map, inset C-50b

Ingleswood, Calif., city 10, mi. s.w. of Los Angeles between two oil fields; pop. 30,114; furniture, aircraft.

Ingles, Mary Draper (1729-1813) V-308

In'goldsby, Thomas, pen name under which the English humorist, Reverend Richard H. Barham (1798-1845), wrote the whimsical 'In'goldsby Legends'.

Ingolstadt (*ing'ol-shtät*), Germany, fortified town on Danube River 45 mi. n. of Munich; pop. 27,000; guns, soap, brushes.

In'got, a mass of cast metal
copper C-360
iron I-145, *pictures* I-138, 139, 140
tin "blocks" T-98

Ingrain carpet R-173

Ingres (*ān'grē*), Jean August Dominique (1780-1867), French portrait and historical painter, leader of classicists; remarkable draftsman; influenced by David ('Apotheosis of Homer'; 'Odalisque').

Inheritance (biology) H-283-6. See also in *Index* Heredity

Inheritance (property) W-98
tax T-17

Inlā (*ē-nē-nē'*), Territory of, in French Guiana; 80,000 sq. mi.; pop. about 8500; gold, woods, balata gum: G-183

Initials, illuminated, of books B-178, 180, *pictures* B-178, 179

Initiative (*i-nish'i-ā'tiv*), in government I-78-9

Initiative, personal
character education, *Outline* C-143

Injector, device for feeding water to a boiler by means of a jet of steam from that boiler; by bringing steam into contact with feed water, vacuum is produced, and the velocity imparted to water by the steam gives necessary force to carry the water to the boiler. Injector principle first advanced by Henri Jacques Giffard, a French engineer, in 1859.

Injunction, a writ issued by a court of equity ordering a person or persons to do or not to do a certain thing; issued only when ordinary legal procedure is inadequate; restrains from continuing nuisances, etc.; also issued to safeguard property and business of employers from violence of strikers
in labor disputes L-44c
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engraving and etching E-293-8

India I-79

invisible I-79-80

manuscript writing B-176

printing I-80; color C-308h, i, color plate C-308i

sepia I-79

inkberry, a shrub (*Ilex glabra*) of the holly family with evergreen oblong leaves, toothed toward the apex, and small white flowers followed by black berry-like fruit; also called winterberry.

Ink'erman, Russia, seaport village in s. Crimea, near e. extremity of the harbor of Sebastopol, where English and French in 1854 defeated Russians in Crimean War.

Inkpaduta, Sioux Indian chief, leader of outlaw band which raided border settlements in Minnesota, Iowa, and South Dakota; notorious for Spirit Lake (Iowa) Massacre (1857).

Ink sac, of cephalopods M-218

sepia from I-79

Inland linoleum L-149

Inland revenue, taxation in Great Britain corresponding generally to internal revenue of U. S.

Inland Sea, Japan, 240 mi. long J-185

Inland waterways R-109-11. See also in *Index* Canals; Great Lakes; Lakes; Rivers

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Lakes to Gulf G-149, R-111, I-15-16, C-69, C-189

Mississippi River traffic M-206

Missouri River M-211

monopolies abolished T-125

Ohio's prosperity and O-210

Inland Waterways Corporation, created by Congress 1924; under the Department of Commerce since July 1939; purpose, the coordination of rail and water transportation in U.S.; maintains barge lines; investigates tariff and interchange arrangements between rail and water carriers

Mississippi River M-206

inlaying, or marquetry

chest, *picture* V-274

furniture decoration I-99, 101, 102

Inmau Line, of steamships S-122

'In Memo'riam', by Tennyson T-50

Inn, river rising in e. Switzerland, one of chief tributaries of Danube; 820 mi. long: maps S-351, A-381

Inner ear E-126, 127, 128

Inner Harbor Navigation Canal, New Orleans N-100

Inner Mongolia, the s.e. part of Mongolia; area about 826,000 sq. mi.; pop. about 5,000,000: M-222a-23, map M-222c

inner tubes R-183, 187

In'ness, George (1825-94), one of greatest of American landscape painters, born Newburgh, N. Y.; distinguished for beautiful coloring and poetical feeling: P-27
'Autumn Oaks', picture P-28

Inning, in sports
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curling C-414

Innsid'ing. See in *Index* Enniskillen

Innocent I (died 417), pope I-80

Innocent II (died 1143), pope I-80

Innocent III (1161?-1216), pope I-80
Kling John's conflict with J-222
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St. Francis' work sanctioned by F-187

Innocent VII (1336-1408), pope I-80

Innocent VIII (1432-92), pope I-80

Innocent X (1574-1655), pope I-80

Innocent XI (1611-89), pope I-80

Innocent XII (1615-1700), pope I-80

Innocents, massacre of the, slaughter of the children of Bethlehem by Herod's soldiers J-213-14

'Innocents Abroad', a humorous travel book by Mark Twain recording the experiences and adventures of a party of Americans in Europe, the Holy Land, etc.

Innocents' Day, or Chhildermas, December 28, festival in memory of Herod's massacre of the children; parents sometimes abandon their authority for the day while the children make merry.

Innsbruck (*ins'bruk*), Germany, historic and picturesque city on Inn River in Austrian Tyrol; pop. 56,000; university; cotton and wool weaving; glass and mosaic work: T-175, map A-381

scene near, picture A-379

Inns of Court, London, headquarters of the legal profession in England. Occupied by 4 legal societies which take their names from the original buildings in the group—Lincoln's Inn, Gray's Inn, Inner Temple, and Middle Temple (the latter 2 known collectively as "The Temple"). Seat of the Council of Legal Education, which superintends education and examination for the English Bar: L-187

birthplace of Lamb L-56

Innuits (*in'yū-its*), native name for Eskimos E-300

Inoculation, in medicine, the injection of a substance into the body to communicate, cure, or prevent disease

antitoxins and serums A-223-4
vaccination V-267

Inoculation, of soil
nitrogen-fixing bacteria N-148, A-117

Inönü (*i-nō'nyū*), **İsmet** (*is'mēt*) (born 1881), president of Turkey, successor to Kemal Atatürk, 1938; surname derived from field on which, as General İsmet Pasha, he defeated Greek army, 1921; premier of Turkey almost continuously, 1923-38; served in Balkan and 1st World wars.

Inorganic chemistry C-178a. See also in *Index* Chemistry

Inositol (*in-ō'si-tol*, vitamin V-311a

Inouyo (*ē-nō'yō*), **Kaoru**, Marquis (1835-1915), Japanese statesman, a leader in reform movement which culminated in Revolution of 1867; for 30 years, while he was in cabinet, no great issue in finance or foreign affairs settled without his advice.

Inquest, a judicial inquiry
coroner's J-230
early form J-230-1

In'quillino, an insect which lays eggs in nest of another insect, thus living as a parasite
bees B-78

Inquilinos (*in-kwi-lō'nōs*), tenant farmers of Chile C-207b, d, picture C-207c

Inquisition, in the Roman Catholic church I-80

Galileo forced to recant G-2

Isabella and I-152, I-80

under Philip II S-230, P-163

In Salah, or **In Sala**, also **Ain Salah**, Algeria, town in n. cent. Sahara; caravan center; occupied 1900 by the French: map A-42a

Inscribed angles G-51

Inscription Rock, in New Mexico. See in *Index* El Morro

Insecta, scientific name for insect or hexapod (six-legged) class of arthropods. See in *Index* Insects

Insecticide S-262-3

airplanes spread, picture I-89

Insectiv'ora, an order of insect-eating mammals M-44, *Outline* Z-229

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army worm A-308-9

cankerworms C-72

codlin moth C-294

corn borer I-89, 90, pictures I-93

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gipsy-moth I-89

peach moth, oriental I-89

satlin moth I-89-90

chinch bug C-222, I-89

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cockroach C-291

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corn crop protection C-387

dusting by airplane I-90, picture I-89

fumigation, picture E-145e

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Index Animals, subhead instinct

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combination of interacting reflexes

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man E-163, P-36C

Institute for Advanced Study, Princeton N.J., founded (1930) to provide advanced study beyond college

graduate school; schools of mathematics, humanistic studies, and economics and politics.

Institute for Propaganda Analysis

C-324c

Institute of France A-4

Institute of Politics. See in *Index*

Politics, Institute of

ü=French u, German ü; gem. ðo; thin, then; ñ=French nasal (Jean); zh=French j (z in azure); k=German guttural ch

- Institute of Public Opinion**, founded by George H. Gallup in 1935 to interview and record the votes of a small but representative cross-section of public on a specific topic (popularly called Gallup Poll).
- 'Institutes', of Justinian** J-231
- Institutions**, in sociology S-183-4
- Institutum Divi Thomae**, research institute and graduate school of science under auspices of Cincinnati Catholic Archdiocese; founded 1935; marine laboratory at Palm Beach, Fla., affiliated laboratories in colleges and hospitals.
- Instrumental music**. *See in Index* Music; Musical instruments
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- Insulators**, electric, substances which do not conduct electricity, or conduct it very poorly E-220, 221, 222
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mica M-145
quartz, fused Q-3
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- Insulin**, diabetes remedy G-100
- Insull, Samuel** (1859-1938), capitalist, born London; came to U.S. 1881 as secretary to Thomas A. Edison; became president Commonwealth Edison Co., Chicago, 1907; controlled public utility companies in Middle West; bankrupted 1932; tried and acquitted on mail fraud charge.
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Interior Provinces, name formerly given to n. Spanish settlements in American Southwest S-222-3
Interjection, in grammar G-127
Interlaken (*in-tēr-lä'kēn*) ("between the lakes"), Switzerland, popular pleasure resort in Alps between Lakes Thun and Brienz, 25 mi. s.e. of Bern; starting point for excursions to Lauterbrunnen and the Jungfrau.
Interlocking directorate T-140
Interlocking plants, on railroad R-43
Intermediate colors C-308b
Intermediate school, junior high school E-185
Intermezzo (*in-tēr-mē'zō*), in music, a short piece played between the acts, stanzas, or movements of a longer work. It may be played as a separate composition.
Intern (*in'tēr'n*), or interne, in hospital H-345
Internal combustion engine. *See in Index* Gas engine
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International, The, name of various organizations of national socialist or labor bodies. *See in Index* First International; Second International; Third International
International Bureau of Weights and Measures M-130
International code
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International Communications, Division of, in U.S. government U-222
International Correspondence Schools, Scranton, Pa., founded 1891 to give courses of instruction on safe methods of mining to coal mine owners and workers; now includes general home study courses, vocational, and specialized courses in technical subjects.
International Council of Women W-133
International Court of Arbitration. *See in Index* Permanent Court of Arbitration
International date line T-95, *maps* T-95, P-10b-c
'Internationale, L' (*län-tēr-näs-yō-näl'*), rallying song of revolutionary workers in all countries; na-

Key—cāpe, āt, fār, fāst, whāf, fāll; mē, yēt, fēr'n, thēr'e; sē, bīt, rōw, wōn, fōr, nōt, dō; cāre, bāt, ryde, fūll, bār'n-

tional anthem of Soviet Union; written in 1871, words by Eugène Pottier and music by Adolphe Dégéyter.

International expositions F-4-5. See also in *Index* Fairs and expositions

International Falls, Minn., city on Rainy River, 86 mi. n.w. of Virginia; pop. 5626; chief port of entry into Canada from U. S. for tourists and sportsmen visiting lake and forest region of w. Ontario; lumber, pulp and paper mills; Fort Frances, Ont., lies across Rainy River: map U-1880

International Federation of Home and School P-70

International Federation of Trade Unions (IFTU) L-45

International Harvester Company, leading manufacturer of farm-operating equipment; organized in 1902 in state of New Jersey; general offices in Chicago

Supreme Court decision T-146

International Institute of Agriculture. See in *Index* Agriculture, International Institute of

Internationalization, in International law I-109

International Joint Commission, created by a treaty in 1909 between the United States and Great Britain; has jurisdiction over boundary waters between United States and Canada and promotes friendly co-operation in their use by the two nations; consists of 6 members, 3 appointed by the president of the United States and 3 by the British government upon the recommendation of the government of Canada

Great Lakes G-150

International Justice, Permanent Court of. See in *Index* Permanent Court of International Justice

International Labor Organization L-45, C-205

International Ladies' Garment Workers' Union, formed 1900; headquarters in New York City; organizations in U. S. and Canada: L-44b

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warfare H-185, I-109-10

International Live Stock Exposition, an eight-day annual exposition of live stock and crops, held at Chicago, Ill.; founded 1900; opens annually on first Saturday after last Thursday in November; receives exhibits from states in the Union and from Canadian provinces

Four-H clubs at F-165

International News Service N-109

International Order of Good Templars. See in *Index* Good Templars

International Peace Garden, park on border between North Dakota and Manitoba dedicated (1932) to friendship between the U. S. and Canada; area 2200 acres (1812 from Canada, 888 from U. S.).

International pitch, in music S-187, diagram S-198

International postal service P-323

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International Red Cross Committee R-60

International relations. See also in Index Arbitration, international; Commerce; Diplomatic service; International law; International settlements, bank for; International trade; League of Nations; Monroe Doctrine; Peace movement; Tariff; Treaties.

International settlement, China C-221j-k

Shanghai S-101, 102

International Settlements, Bank for I-110

International Telecommunication Convention R-26

International trade I-110-12. See also in *Index* Commerce; Exports and imports; and subhead commerce under countries

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International Woman Suffrage Alliance W-133

International Working Men's Association. See in Index First International; Second International; Third International

International zone, Tangier T-8, 9

Interne, or Intern, in hospital H-345

Internment, detention during war of the subjects or property of a bel-

ligerent by another belligerent or by a neutral. Under international law, a belligerent country may intern enemy merchant ships in its ports, property owned by enemy civilians ("enemy aliens"), and enemy civilians themselves. Neutral countries are obliged to intern belligerent troops which enter their borders and belligerent war vessels and prizes which enter their harbors and fail to leave after the interval set by international law.

Internuncio (in-tér-nún'shū-ō), a diplomatic representative of the pope of lower rank than a nuncio.

Inter-Parliamentary Union, an association of statesmen from different nations for working for peace and international cooperation; first conference in Paris 1889.

Interregnum, Great, in German history, the interval (1254-73) between the fall of the Hohenstaufen emperors and the election of the first Hapsburg.

Interrogation point P-368

Interrogative adverb A-23

Interrogative pronoun P-351

Interrogative sentence S-79

Interstate Commerce Commission

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Hepburn Law R-151

safety work S-2b

Intertype L-153

Interurban railway S-308

Interval, in music S-197-8

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Intervention, diplomatic or military interference by one state in the affairs of another, on humanitarian or legal grounds, forcing it to do or not to do certain things A-246

Cuba by United States C-412

international law I-108

Monroe Doctrine M-241-2

Interventionists, term applied (1939-41) to Americans who believed the U. S. government while still at peace should actively aid the countries fighting against the Axis powers in the 2d World War. See also in Index Isolationists

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'Intrepid, The,' vessel captured from the Tripolitans in which Stephen Decatur sailed into the harbor of Tripoli Feb. 16, 1804, and set fire to the American frigate 'Philadelphia,' which had been captured by the enemy.

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ü=French u, German ü; ðom, ðo; ðin, ðen; ð=French nasal (Jean); zh=French j (z in azure); k=German guttural ch

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on n.e. coast on Ness River; pop.
28,000; cap. of Inverness-shire,
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Involuntary muscles M-304-5
Ie (*iē*), in Greek mythology, maiden
loved by Zeus and changed into a
heifer I-118
Bosporus legend B-198
Iodine (*iō-dēn* or *iō-din*), a chem-
ical element I-118, C-176, table
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antidote for F-64
antiseptic I-118; for wounds F-65
food must contain F-145-6
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salamander larvae and S-13
sublimates from solid to gas P-190
Iodized salt I-118
Io'doform, an antiseptic I-118
Ioleus (*i-ōl'ūs*), in Thessaly, ancient
city of Greece; place from which the
Argonauts embarked: A-281
Ion, an electrically charged particle
C-172-3, E-225, E-239, E-242-3. See
also in Index Ionization
Iona (*i-ō-nā*), one of Inner Hebrides;
5 sq. mi.; center of Celtic Christi-
anity: H-267
Io'nia, in ancient geography, a district
on the w. coast of Asia Minor and

adjacent islands, settled by the
Ionian Greeks: map G-154
Ionian Islands, group of 7 islands in
Ionian Sea off w. coast of Greece,
maps B-18, E-326d-e
ceded to Greece G-162
Ionians, one of the four great
branches of the Greek people G-156
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Ionian Sea, the part of the Mediter-
ranean between Greece and s. Italy,
map B-18
Ionic (*i-ōn'ik*) architecture A-260-1,
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Mausoleum at Halicarnassus S-82,
picture G-167
Propylaea, picture A-11
Ionic compounds. See in Index Polar
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Ionic dialect G-174
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Ionization C-172-3, E-225, E-239
acids and bases A-9, 10
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electrolysis E-225, picture C-166
electrolytes and non-electrolytes
C-172
lightning flash theory L-135-6
Ion of Chios (*iōn kī'ōs*), Greek
writer of the age of Pericles; knew
Aeschylus, Sophocles; won prizes
for tragic and dithyrambic poetry.
Ionopsidium (*i-ō-nōp-sīd'i-um*), or
diamond flower, a perennial plant
(*I. acule*) of the mustard family,
native to Portugal. Low growing;
leaves heart-shaped at base;
flowers lilac, covering plant with
color; used in rock gardens. Also
called violet cress.
Io'nosphere, belt of air, picture A-63
Kennelly—Heaviside layer R-24
Iophon (*iō-fōn*), Greek tragic poet,
son of Sophocles; won second prize,
428 B.C., Euripides being first; is
mentioned in "The Frogs" of Aris-
tophanes; wrote 50 plays of which
only a few fragments remain.
Ios (*iōs*), modern Nio, Greek island,
one of Cyclades in Aegean Sea, 13
mi. s. of Naxos; about 45 sq. mi.;
legendary burial place of Homer.
Iowa, a n. cent. state of U. S., the
leading corn state of the Union;
56,280 sq. mi.; pop. 2,538,268; cap.
Des Moines: I-119-22, maps I-120,
U-1880
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hog production H-316
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natural features, list I-119
products, chart I-120, list I-119, pic-
ture I-119a
water power: Davenport, picture
I-119b; Keokuk I-120, 122
Iowa, State University of, at Iowa
City; established 1847; liberal arts,
commerce, law, medicine, dentistry,
pharmacy, engineering, education;
graduate college: picture I-121
Iowa City, Iowa, industrial city 50 mi.
w. of Davenport on Iowa River in
rich agricultural section; pop. 17,-
182; advertising novelties, per-
fumes, flour, iron works; state
university: map I-120

Iowa Indians, tribe of Siouan stock;
originally living in Minnesota;
moved s. and later settled on Kan-
sas and Oklahoma reservations.
Iowa River, in Iowa; flows 350 mi.
s.e. to Mississippi, map I-120, pic-
ture I-122
**Iowa State College of Agriculture and
Mechanic Arts**, at Ames, Iowa;
founded 1868; agriculture, engi-
neering, home economics, industrial
science, veterinary medicine
belltower, picture I-121
Iowa State Teachers College, at Cedar
Falls, Iowa; founded 1876; teacher
training for elementary and sec-
ondary schools.
Iowa Wesleyan College, at Mount
Pleasant, Ia.; founded 1842; Meth-
odist Episcopal; liberal arts, music,
commercial, and normal work.
'I Pagliacci' (*i pāl-yāt'chē*), opera by
Leoncavallo O-232, picture O-234
Ip'caac, South American plant of the
madder family
emetic P-275
Iphigenia (*if-i-gē-nēā*), in Greek
mythology, daughter of Agamem-
non, sacrificed in Trojan War T-143
Iphitus (*if'i-tūs*), in Greek mythol-
ogy, one of the Argonauts; friend
of Hercules, who slew him in fit
of rage.
Ipomoea (*ip-ō-mēā* or *i-pō-mēā*), or
morning-glory, a genus of the
morning-glory family, which in-
cludes the cultivated morning-
glories: sweet-potato (*I. batatas*),
wild sweet-potato vine (*I. pand-
urata*), blue dawn-flower (*I. leari*),
common morning-glory (*I. pur-
purea*), bush morning-glory (*I. leptophylla*); some place the moon-
flower (*I. bona-nox*) in this genus.
Ip'swich, England, port and manu-
facturing town on Orwell estuary,
64 mi. n.e. of London; pop. 88,000;
cap. of Suffolk: map E-270a
I. Q., or intelligence quotient I-97
Iquique (*i-kē-kā*), one of leading
ports of Chile, in extreme n.; pop.
46,000; exports nitrate: maps
C-206, S-208b-c
Iquitos (*i-kē-tōs*), trade center of
n.e. Peru on Amazon River, at head
of navigation for ocean vessels,
2500 mi. from mouth; pop. 10,000
journey from Lima P-140
Iran (*ēr-rān*'), native name for Persia
P-129-34. See also in Index Persia
Iranian (*i-rān'ān*) Plateau, or Iran,
Plateau of, high tableland includ-
ing Afghanistan, Persia, and Balu-
chistan P-129-30, picture M-167
Iran'ic languages P-171
Iraq (*i-rāk*'), an Arab kingdom, in-
cluding most of Mesopotamia, for-
merly under British mandate; 116,-
000 sq. mi.; pop. 8,560,000; cap.
Baghdad: I-123, maps A-242,
A-332b. See also in Index Mesopo-
tamia
alliance treaty with Saudi Arabia
A-242
Baghdad B-14-15
Kish K-25; excavations K-25, pic-
tures A-258, T-121
Tigris and Euphrates rivers T-93,
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Irawadi River. See in Index Irra-
waddy
Irazu (*i-rū'sq*), Mount, Costa Rica,
volcano near Cartago (11,200 ft.)
C-374
**"I regret that I have but one life
to lose for my country"** H-199
Ireland, John (1838-1918), American
Roman Catholic prelate, born Kil-
kenny County, Ireland; emigrated
to St. Paul, Minn., at age of 11:

Key—cape, āt, fār, fāst, whqt, fāll; mē, yēt, fērn, thēre; īce, bīt; rōw, wōn, fōr, nōt, dā; cūre, būr, ryde, fūll, būrn;

ordained priest 1861; chaplain in Civil War 1862-63; archbishop 1888-1918; advocated temperance, colonization of Northwest, organized labor, Catholic education.

Ireland, Gaelic *Éire* (*ár-á*), (1) geographically, the smaller of the two main British Isles; 32,000 sq. mi.; pop. 4,250,000: I-124-9, *maps* I-129, E-270a, B-326c, d, f, *Outline* G-144-5, (2) Politically, five-sixths of Ireland, formerly Irish Free State; 26,800 sq. mi. pop. 3,000,000; cap. Dublin: I-130-1, *maps* I-129, E-270a. See also in *Index* Irish Free State: Northern Ireland agriculture I-124, 129, 130: flax industry, *picture* F-105 bibliography G-148 boats used by early Britons B-165, *picture* B-162 cities: Belfast B-85; Cobh C-290; Cork C-366; Dublin D-115 commerce I-129, 130, C-368: exports and imports, *table* C-480 education L-181, B-85: University of Dublin U-260 emigration I-127, I-22, 23 flag F-95, *color plate* F-88 folk-lore I-131-2, F-3: folk-songs F-134; folk-tales S-303g-h, u-o Gaelic language I-131, 132 government I-128, 129, 131, G-144 history I-126-8, C-368 Druids C-124 St. Patrick P-88-9 English conquest I-126 rebellion of 1641 I-126 battle of the Boyne I-127 union with Great Britain I-127 O'Connell and the Catholic Emancipation Act O-201 potato famine I-127: Peel repeals Corn Laws P-100 Home Rule I-128-9: Belfast opposes B-85; Gladstone's measures G-98; O'Connell's work O-201; Parnell P-81-2 land acts I-128: boycott policy B-212, P-81-2 Easter Rebellion D-115, I-128 Sinn Féin I-128, 129, C-366 Dominion status treaty I-129 Northern Ireland I-129 Irish Free State I-130-1 hydroelectric power I-126, *picture* I-131 illiteracy P-304d literature. See in *Index* Irish literature manufactures I-129, 130, B-85, C-306: lace L-47, 48, *picture* L-49; linen thread T-85 marriage customs M-89 name, origin I-132 national song N-24 peat cutting, *picture* P-99 people I-124, C-124 religion I-124, 126, 127: Emancipation Act O-201 shamrock, the emblem S-101 shelter, *pictures* I-126, 127 woman suffrage W-133 wrestling W-183

Ireland, National University of, one of two universities of Irish Free State (the other, University of Dublin and Trinity College); founded 1908 in Dublin; governing senate largely Roman Catholic; three branches: Dublin, Cork, Galway; enrollment over 3000.

Ireland, Northern. See in *Index* Northern Ireland

Irenaeus (*i-ré-né'ús*), Saint (died 202 A.D.), a Greek church father and martyr, bishop of Lyons.

Irene (*i-ré-né*) (752?-808), Byzantine empress, first woman to rule Eastern Empire; originally a poor orphan, seized power in 780, on death of her husband, Leo IV; planned to unite Eastern and Western Empires

by marrying Charlemagne; blinded and later murdered her son Constantine VI; became empress 797; deposed (802) and exiled by Nicephorus, who succeeded her as emperor.

Irides'cence L-129, *diagram* L-128

Iridium, a silver-white metallic element, found chiefly in Ural Mts. C-176, *table* C-168 alloys A-133, P-246 found with platinum P-247

Irigoyen (*é-ré-gó'yén*), Hipólito (1850?-1933), president of Argentina (1918-22, 1928-30) A-281 monument, *picture* A-280d

Iris, in Greek mythology, rainbow goddess, messenger of gods R-46 flower named for I-130

Iris, of the eye E-349, *diagram* E-349

Iris, French fleur-de-lis, a flower I-130, *color plate* I-130a-b French emblem F-84 structure of tuber B-269

Irisarri (*é-ré-sá'rí*), Antonio José de (1786-1868), writer of Guatemala L-67v

Iris diaphragm, in photography P-185

Iris family, or Iridaceae (*i-ri-dá'sé-é*), a family of plants including the crocus, gladiolus, freesia, iris, ixia, tigridia, blackberry-lily, blue-eyed grass, and the tritonas.

Irish Free State (officially called Ireland in English and Éire in Gaelic), an independent nation, embracing five-sixths of Ireland; 26,600 sq. mi.; pop. 3,000,000; cap. Dublin: I-130-1, *maps* I-129, E-270a. See also in *Index* Ireland flag F-95, *color plate* F-88 woman suffrage W-133

Irish Guards, 1st World War regiment Kilping's history K-24b

Irish in America I-22, 23, I-127

Irish lace L-48, *picture* L-49

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Irish Land League P-81, B-212

Irish language I-131, 132

Irish literature I-131-2, C-124. See also in *Index* names of chief writers drama D-98: chief dramatists, list D-98 folk-tales S-301, 303g-h, L-160, 161: list S-303u, o

Irish milk, *table* W-67

Irish moss, or carrageen, a seaweed, source of vegetable gelatin S-73, *picture* S-72

Irish potato, or white potato P-324-6. See also in *Index* Potato

Irish Sea, body of water between England and Ireland, with North Channel at n. and St. George's at s.; area 39,900 sq. mi.; mean depth 197 ft.: *maps* E-279, E-270a

Irish setter, a hunting dog D-83

Irish terrier D-82, *picture* D-79

Irish water spaniel D-83

Irish wolfhound D-83

Irkutsk (*é-ré-kétsk'*), important trade center of Siberia, near Chinese border and near s. end of Lake Baikal; pop. 245,000; on Trans-Siberian Railway: *map* A-332b

Iron, Ralph. See in *Index* Schreiner, Olive

Iron, a metallic chemical element I-133-8, C-175, *table* C-168. See also in *Index* Iron and steel industry: Steel abundance in earth's crust, *diagram* C-167 alloys A-130-31, I-142: alnico, *picture* A-133. See also in *Index* Steel, subhead alloys arsenic A-310 manganese M-53 permalloy A-131 case hardening C-419, I-146

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Iron Age, the 3d and highest period of Barbarism M-49, I-134-5 lamp, *picture* L-57

Iron alum A-137

ü=French u, German ü; gem, go; thln, then; ñ=French nasal (Jeañ); sh=French f (s in azure); K=German guttural ch

Iron and steel industry I-133-46. See also in Index Iron; Steel
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 England E-273, 278-80; Birmingham B-147; Sheffield S-108
 France F-176
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 Luxemburg L-222
 Scotland: Glasgow G-100
 United States I-144, 145: Alabama A-98b, B-146-7; Illinois I-18, graph I-13; Indiana I-48, G-17, graph I-46; Ohio O-212, C-268, Y-208-9, graph O-209; Pennsylvania P-113, P-225, graph P-112
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 shipbuilding S-122, 126-7
 steel mill at night, Pittsburgh, picture P-114
 wire-making W-119-21
 "Iron City" (Pittsburgh) P-225
 Ironclads, naval vessels armored with iron; name sometimes incorrectly applied to vessels covered with steel armor plate: M-225, N-56c, picture C-255
 Korean, 15th century K-38
 Monitor E-300, M-225, picture C-255
 Iron Cross, German military decoration D-32
 Iron crown of Lombardy M-169
 Charlemagne crowned with L-181
 Napoleon crowned with N-9
 Irondequoit, N. Y., residential suburb 4 mi. n.e. of Rochester, on Irondequoit Bay, off Lake Ontario; pop. 28,376.
 Iron Gate, or Iron Gates, gorge with rapids in the lower Danube River between Rumania and Yugoslavia; nearly barricaded by a rugged spur of the Transylvanian Alps: D-14, map B-18
 Ironing, by machinery L-71
 Iron Knob, an iron ore mountain in Australia A-374b
 Iron lung, artificial respirator used in treatment of paralysis of respiratory muscles in infantile paralysis; invented 1928 by Philip Drinker and Louis Shaw. Rhythmically interrupted vacuum, in airtight chamber enclosing the patient's trunk, draws out and then releases the rib cage, thus filling and emptying the lungs.
 Iron Mask, Man in the I-147
 Iron Mountain, Mich., iron mining and shipping city in n. peninsula on Menominee River; pop. 11,080; automobile parts, lumber, paper: map M-153
 Iron Mountain, in Missouri, hill 1077 ft. high M-208, O-266
 Iron pyrites, or fool's gold I-135, M-182
 a source of sulphur S-324
 Iron quartermaster, automatic steering device G-192
 "Ironsides," Cromwell's regiment C-400

"Ironsides, Old". See in Index "Constitution"
 Ironton, Ohio, industrial city 100 mi. s. of Columbus on Ohio River; pop. 15,851; clay, iron ore, and bituminous coal region; various iron and cement products, lumber, shoes: map O-210
 Ironwood, Mich., city in famous Goebie iron region, 12 mi. s. of Lake Superior; pop. 13,369; trade center for mining and lumber interests: map M-153
 Ironwood, a common name for many plants and trees with hard wood. Is applied to buckthorn, Catalina ironwood, desert ironwood, and American hop hornbeam.
 Irony (*Tron-i*), a figure of speech in which the words are intended to convey an impression different from their literal meaning, often the very opposite. Sarcasm is a bitter form.
 Iroquois (*ir-ō-woi'*) Indians, or Five Nations (Six Nations after 1722), confederacy of North American Indians formerly living in central and w. New York I-53-4
 allies of English C-139
 Champlain incurs enmity C-139, picture A-159
 Delawares and D-41
 Frontenac subdues F-209
 houses I-59, S-111, picture I-59
 social and political organization F-11
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 Iroquois Theater fire, Chicago C-198
 Irradiation of food V-311a, 312, picture H-371
 Irrawaddy (*ir-ā-wū'dī*), formerly Irawadi, chief river of Burma; rises in n. flows s. 1500 mi. to Bay of Bengal: B-278a, 278b-79
 rice growing R-103
 Irregular verbs V-282
 Irrigation and reclamation I-147-50
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Nevada N-76, picture I-149; New Mexico N-97-8, R-109, picture N-98; South Dakota S-217; Tennessee T-49; Texas T-56, 58, D-6; Utah U-263-4, 266; Washington W-29, 32, pictures W-30, 31, I-148; Wyoming W-194
 T. Roosevelt aids R-152, I-149
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 Irritant poisons P-275
 Irving (*irv'ing*), Sir Henry (1838-1905), famous English Shakespearean actor-manager long associated with Ellen Terry; first English actor knighted; Hamlet, Macbeth, Othello, Shylock, King Lear were favorite parts.
 Irving, Washington (1783-1859), American essayist, historian, and story-writer I-150-1, A-177, pictures I-150, A-177
 humor, example F-32
 Peter Stuyvesant described by S-310
 Irvington, N.J., residential suburb of Newark, adjoining it on s.w.; pop. 55,328; smelters, foundries, tannery; wall paper, linoleum.
 Irwin, Edward Frederick Lindley Wood, first Baron (born 1881), name by which the present 3d Viscount Halifax was known until he acceded to his hereditary title in 1934. See in Index Halifax, Edward Frederick Lindley Wood, Viscount
 Irwin, Wallace (born 1876), American writer, born Oneida, N.Y.; brother of Will Irwin; edited *Overland Monthly*, wrote humorous stories, burlesques and light verse ('The Love Sonnets of a Hoodlum', 'Letters of a Japanese Schoolboy').
 Irwin, William (Henry) (born 1878), author and journalist, born Oneida, N. Y.; war correspondent 1916-18 ('Men, Women and War', 'Highlights of Manhattan').
 Isaac (*ī'sāk*), Hebrew patriarch, son of Abraham, and father of Jacob and Esau: A-4, J-215
 burial place P-34
 meaning of name N-2
 Isaac I, Comnenus (died 1061), Byzantine emperor from 1057 to 1059, founder of Comneni dynasty; reformed taxation and effected economies.
 Isaacs (*ī-sā'āks*), Jorge (1837-95), novelist of Colombia I-677, u
 Isaacs, Rufus D. See in Index Reading, Marquis of
 Isabel'in, of Castile (1451-1504) I-152. See also Ferdinand II of Aragon
 Cardinal Ximenes and X-197-8
 Columbus aided by C-318, I-152
 Isabella, of France (1292-1358), queen of Edward II of England and daughter of Philip IV of France E-189
 Isabella II (1830-1904), queen of Spain; succeeded 1833; driven from Spain by revolution in 1868; abdicated 1870; mother of Alfonso XII.
 Isabey (*ī-sā-bē'*), Jean Baptiste (1767-1855), French portrait painter; pupil of David; became court painter ('Review of Troops by the First Consul').
 Isaiah (*ī-sā'yā*) (8th century B.C.), one of greatest of Old Testament Hebrew prophets; 24th book of Old Testament named for: P-352
 meaning of name N-2
 Isar (*ī'sār*) River, rises in Tyrolean Alps in s. Bavaria, flows n.e. 219 mi. to Danube; total fall 4816 ft.: map G-66
 Ischia (*īs'kā-ū*), volcanic island of Italy 16 mi. s.w. of Naples; 26 sq. mi.; pop. 28,000.

Ischium (*is'hi-um*), the lower dorsal portion of the hip-bone S-158, *picture* S-158

Ischl (*ish'l*), Germany, fashionable summer resort, 28 mi. s.e. of Salzburg; pop. 10,000; formerly summer residence of Austrian imperial family.

Isengrim the Wolf, character in beast-epic of 'Reynard the Fox' F-166

Isco (*ē-sō's*), also Sebino, Lake of, in n. Italy at s. foot of Alps, 15 mi. n.w. of Brescia; formed by Oglio River; 24 sq. mi.

Isère (*ē-sēr*) River, rises in Alps in s.e. France and flows s.w. 180 mi., to Rhone.

Iserlohn (*ē-sēr-lōn'*), Germany, manufacturing city in Westphalia; pop. 33,000; needles, bronze, brass ware.

Isleult (*ē-spl'*), Yseult, or Isolde, heroine of medieval romance 'Tristan and Isleult'. *See also* Tristan

Isfahan (*is-fā-hān'*), also Ispahan, city of Persia, near center; pop. 100,000; trade in brocades, felts, metal work, leather; in 17th century was cap. of Persia, had pop. of nearly a million, and was great market of Asia: P-130, *map* A-332b

rug, color plate R-170a-b

Ishikari (*ē-shē-kā-rē*) River, in w. part of island of Hokkaido, Japan; over 200 mi. long; flows through rich coal districts s. and w. into Otaru Bay.

Ishmael (*ish-mā-ēl*), son of Abraham and Hagar, Sarah's Egyptian hand-maid; ancestor of Ishmaelites (Arabs, according to Arab tradition); dispossessed by Isaac; driven out with his mother and grew up in the wilderness.

Ishpeming, Mich., iron-mining center, 11 mi. w. of Marquette in great Lake Superior mineral region; pop. 9491; also gold, marble, and building stone near by; lumber mills: *map* M-153

Ish'tar, chief goddess of Babylon and Assyria, corresponding to Phoenician Astarte and Greek Aphrodite; the "Great Mother," goddess of fertility, love, war.

Isinglass (*ī-zing-glass*), a semi-transparent gelatin; name sometimes applied to the mineral mica: G-25

Isis (*ī'sis*), chief goddess in Egyptian mythology I-152, O-252

Isis, Temple of, or Temple of Philae, on island of Philae in Nile River; erected by Egyptians to goddess Isis, 4th century B.C.: E-211, *picture* E-210

Is'lam (Arabic, "obedience to the will of God"), another name for Mohammedanism, also for the whole group of Mohammedan peoples. *See in Index* Mohammedanism

Island Number Ten, island in Mississippi River near n.w. Tenn., captured April 1862 by Federal army under Pope and gunboats under Foote; washed away by river after war: *map* C-253

Island Range, partially submerged mountains in Pacific just off Canadian mainland whose visible peaks form Vancouver Island and Queen Charlotte Islands; highest point Victoria Peak on Vancouver (7484 ft.).

Islands, land formations entirely surrounded by water P-198. For list of world's largest islands see *table* on this page
coral C-362-4, P-5, *picture* P-199
largest man-made, *picture* F-4a
volcanic V-332, P-6, H-239

Island Universe, or galaxy N-61, A-346

Islay (*ī-lā* or *is'lā*), southernmost island of Inner Hebrides, Scotland; 24 sq. mi.: H-287

Isle la Motte, Vt., island in n. section of Lake Champlain, about 7 mi. long and 2 mi. wide; discovered 1809 by Champlain; French built Fort St. Anne on south shore; marble quarries.

Isle of Man. *See in Index* Man, Isle of

WORLD'S LARGEST ISLANDS

	AREA IN SQ. MI.
Greenland, est.	735,000 to 1,250,000
New Guinea	300,000
Borneo	290,000
Madagascar	228,000
Baffin	200,000
Sumatra	163,000
Great Britain	88,210
Honshu	86,953
Victoria	80,000
Ellesmere	75,000
Celebes	72,000
New Zealand (South Island) ..	59,134
Java	43,504

Isle of Pines. *See* Pines, Isle of

Isle of Wight. *See* Wight, Isle of

Isle Royale, island near n.w. coast of Lake Superior, 50 mi. n.w. of Michigan Peninsula; it lies within United States boundaries, about 15 mi. from the Canadian shore; about 45 mi. long, 9 mi. wide; many smaller islands near its shores; forests, copper deposits, fishing: M-154, *map* U-188c

Isles of Langerhans, in pancreas, discovered by Robert Langerhans, German pathologist (1849-88): G-100

Isles of the Blest, or **Fortunate Isles** C-70

Isleta (*ēs-lā'tā*), N. M. (Spanish "little island"), a Tigua Indian pueblo on the Rio Grande below Albuquerque.

Is'lington, metropolitan borough of n. London, England; pop. 322,000.

Isly (*ēs-lē*), small river in Morocco near Algerian border, in 1844 scene of greatest French victory in Algerian wars.

Ismail (*ēs-mā-ēl'*) (1830-95), khedive of Egypt, son of Ibrahim Pasha; succeeded his uncle Said as viceroy 1863; E-200

opening of Suez Canal S-317

Ismene calathina (*is-mē'nē kāl-ā-thē-nā*). *See* Peruvian daffodil

Ismet Pasha. *See* İnönü, Ismet

Isnik, Asia Minor. *See* Nicaea

I'gobars, defined W-60, *picture* W-60a

Isobutylene R-170, *diagram* R-169b

Isocronism, of pendulum P-108

first applied to clocks W-36

Isocrates (*ī-sōk'rā-tēs*) (436-338 B.C.), Athenian orator and patriot; "the old man eloquent" who preached Greek union to conquer Persia and was killed, according to Milton, by report of "that dishonest victory at Chaeronea, fatal to liberty."

Is'olating languages P-171

Isolation, economic I-111-12, C-323

Isolationists, term applied (1939-41) to Americans who believed that the U. S. government should avoid actions and policies that might lead to involvement in the 2d World War. *See also* Interventionists

Isolde. *See* Isleult

Isomers, different chemical compounds having same chemical composition C-178a

Isonzo (*ē-sōn'tsō*) River, in n.e. Italy (formerly in Austria), rises in Alps and flows s. 75 mi. to Gulf of Trieste

1st World War W-159, 162

Isoprene, in rubber chemistry R-189a

Isop'tera, an order of social insects; includes termites and white ants.

Isosceles triangle G-50

Isostasy (*ī-sōs'tā-sī*), theory of E-132

Antarctic studies A-217

Isotherms W-60, *picture* W-60a

Isotope, a variant form of a chemical element, due to different atomic structure C-189

oxygen atom O-262

proof R-16

Ispahan, Persia. *See* Isfahan

Israel (*īz'rā-ēl*), name borne by the Hebrew patriarch Jacob, and by the 12 tribes descended from him: J-215. For history of the kingdom of Israel *see in Index* Jews

Israels, Josef (1824-1911), Dutch genre painter; interpreted with insight and sympathy life among Dutch fisher folk and humble Jewish people; compared to Millet ('The Cradle'; 'Tollers of the Sea').

Israfil (*īz'rā-fēl*), or **Israfel**, archangel of music, who will, in Mohammedan belief, sound trumpet on last day; sung of in Poe's poem, 'Israfel'.

Issachar (*ī'sā-kār*), son of the patriarch Jacob, ancestor of the tribe of Issachar.

Issus (*īs'sūs*), ancient seaport in s.e. Asia Minor, of great strategic importance because of its location on the pass from Syria into Cilicia. battle of (333 B.C.) A-114, P-134

Istakhr, ancient Persian city. *See in Index* Persepolis

Istanbul (*ē-s'tān-bŭl'*), formerly Constantinople, former cap. of Turkey; pop. 790,000: I-152-3, *maps* E-326e, B-18, B-154, *pictures* I-153, T-159, M-214, T-161, 162

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capital Byzantine Empire B-289-90
Crusaders sack B-200, V-279
early glass making G-106

fire devastates (1729) F-58

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founded by Constantine C-344

Greek culture preserved in E-173

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C-322; library founded by Constantine L-103

police, *picture* T-163

Robert College (now Istanbul American College) T-161

St. Sophia A-262, *pictures* A-261, 265, T-161: columns S-82; Turks

take B-290

Turks capture T-162

Istanbul American College, at Istanbul, Turkey, established 1932 by union of Robert College and American College for Girls at Istanbul. *See* Robert College; American College for Girls at Istanbul

Isthmian Canal Commission P-46

Isthmian (*is'mi-an*) Games, ancient Greek gymnastic, equestrian, and musical contests in honor of Poseidon held on the Isthmus of Corinth every two years.

Isthmus (*is'mūs*), narrow neck of land connecting two larger portions of land, as Isthmus of Corinth.

Isthmus of Panama. *See in Index* Panama, Isthmus of

istle (*is'tl*), vegetable fiber obtained from leaves of several species of Mexican plants; used for bristles in manufacture of coarse brushes, for basket work, cheap twine, baling rope; also called *pita* and *Tampico* fiber.

istria (*is'tre-ä*), Italian district comprising peninsula in n. Adriatic Sea and adjacent Quarnero Islands.

Itagaki (*ë-tä'gä-ki*), Talsuke, Count (1837-1919), the "Rousseau of Japan"; helped overthrow feudalism; established school to teach principles of government to the people; advocated constitutional government and founded first political party in Japan.

Italia Irredenta (*ë-täl'yü ër-rä-dën'-täd*), "unredeemed Italy," name applied by Italians to nearby districts, Italian in population but under foreign control, chiefly Austrian: W-152, I-158

Trent T-137
Trieste T-138

Italian clover, or crimson clover C-282

Italian East Africa, name under which Italy in 1936 united Eritrea, Ethiopia, and Italian Somaliland E-309, I-173, 158, map E-308

Italian language I-153

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Renaissance R-73-4

Italian millet M-176

Italian Somaliland (*sö-mäl'lë-länd*), Italian colony in n.e. Africa; extends from Gulf of Aden to Juba River; about 271,000 sq. mi.; pop. 1,300,000; exports resins, hides, kapok, ivory: maps A-42a, b, E-308

Italian Tyrol T-175-6, map A-381, picture A-380. *See also in Index* Italia Irredenta

Italic languages, defined P-171

Italic type A-135, B-178, early example B-177

Italy, kingdom in s. Europe; 119,764 sq. mi.; pop. 48,000,000; cap. Rome: I-155-75, maps I-156, E-326o, d, f, Outline I-173-5

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Milan I-164-6, M-169, pictures I-163, E-329

Padua, picture I-166

Pisa P-222, I-164, picture P-223

Ravenna, picture A-263

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St. Peter's R-140-2, pictures A-268, P-55

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Palace of Senators, picture R-139

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Rome-Berlin axis W-176b, c, I-160

annexation of Albania A-107, I-160

2d World War

declares war on England and France I-160, W-178i

diplomatic clash with U.S. W-178o

failure in Africa and Greece W-178p

Franco-Italian armistice W-178j

included in "new order" W-178m

declares war on U.S. W-178w

invasion by Allies W-179d-f

Itard (*ë-tär'*), J. E. Marie Gaspard (1774-1838), French physician and surgeon, noted for researches on diseases of the ear and methods for educating deaf-mutes; pioneered in study of mental deficiency.

Itasca Lake, small lake in Minnesota, 140 ml. w. of Duluth; a source of Mississippi River: map M-192

discovery M-195

Itasca Park, Minn., state park of 80 sq. mi. comprising basin of Itasca Lake; map M-192

Hudson's Bay post, picture F-225

Itch-mite, an insect pest which burrows under the skin and causes scabies in man and animals.

Ithaca, island of Ionian group w. of central Greece; 40 sq. mi. legendary home of Odysseus O-204

Key—cäpe, ät, fär, fäst, what, fäll; mä, yät, färrn, thäre; fce, büt; röw, wön, för, nôt, dç; cäro, büt, ryde, füll, bürn;

Ithaca, N. Y., city at s. end of Cayuga Lake, 47 mi. s.w. of Syracuse; pop. 19,780; Barge Canal terminal; Cornell University; State College of Agriculture; drive chains, sporting guns, cement, salt; *map* N-114

Ithuriel (*i-thū'ri-ēl*), angel of truth in Milton's 'Paradise Lost'; the touch of his spear exposes deceit.

Itimad-ud-daula, tomb of, at Agra, India, *picture* I-43

Ito (*ē'tō*), Hirobumi, Prince (1841-1909), Japanese statesman and leading reformer, 4 times premier; drafted constitution; largely responsible for raising Japan to the first rank among civilized powers, and for modernizing Japanese life; assassinated in Korea while resident general.

Iturbi (*ē-tūr'bē*), José (born 1895), Spanish pianist and conductor, born Valencia; taught piano at Geneva Conservatory 1919-23; made New York debut as pianist 1928, as conductor 1933; conductor of Rochester (N. Y.) Symphony after 1936.

Iturbide (*ē-tūr-bē'dā*), or Yturbi de Augustin de (1783-1824), emperor of Mexico M-142d

Ituri pigmies, in Congo P-218, *pictures* A-35, P-218

Ivan III, the Great (1440-1505), grand duke of Moscow I-175

Ivan IV, the Terrible (1530-84), czar of Russia I-176

Cathedral of St. Basil, Moscow, built by M-264

'Ivanhoe', novel by Scott S-50

Thackeray's burlesque of T-72

Ivanof (*ē-vūn'ōf*), Vsevolod Vlachoslavovich (born 1896), Russian novelist and short story writer ('Armored Train'; 'Colored Winds')

place in Russian literature R-197

Ivanovo (*ē-vūn'ō-vō*), Russia, manufacturing town on Uvod River 160

mi. n.e. of Moscow; pop. 285,000; *map* E-326e

Ives, Frederic Eugene (1856-1937), American inventor, born Litchfield, Conn.; invented modern half-tone engraving process; pioneer in color photography.

Ives, Herbert Eugene (born 1882), American physicist and inventor, born Philadelphia, son of Frederic E. Ives; physicist Bell Telephone Laboratories 1919-; inventions in telephotography and television.

Ives, James M. (1824-95), American business man and artist, born N.Y. City; partner in lithograph firm Currier & Ives after 1857; directed production of famous prints which depict life of American people from 1835 to about 1900; a few of the prints were Ives' own drawings.

Iviza (*ē-vē'thā*), also Ibliza, one of Balearic Islands B-17, *map* S-226

Ivory I-175-6

ancient spear heads, *picture* I-52

carving I-176: ancient Crete, *picture* A-26; Japan J-202, *picture* J-198

elephant tusks B-246, I-175-6, *pictures* B-244, 245, I-175

fossil M-44, A-277

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walrus tusks W-6, *picture* A-101

Zanzibar Z-216

Ivory-billed woodpecker W-135, B-145b, *picture* W-134

Ivory black, a high grade of bone black, made from ivory chips and cuttings.

Ivory Coast, colony in French West Africa between Liberia and British Gold Coast; 184,000 sq. mi.; pop. 3,850,000; dense forests; palm products, rubber; cap. Abidjan (pop. 26,000): A-34, *map* A-42a

Ivory-nuts, also called tagua, or

corozo I-176

buttons from B-287-8

Ivry (*ē-vrē'*), battle of (1590) H-279

Ivy I-176

American (Virginia creeper) V-309

poison P-272, I-176

poisoning, treatment F-66

sensitive to touch P-242

Ivy Lea, Ontario terminus of Thousand Islands Bridge S-8

Iwakura (*ē-wū'ko-rā*), Prince Tomomi (1835?-83), Japanese statesman; leader in movement to abolish feudalism.

I. W. W. (Industrial Workers of the World): L-44a, C-325

Ixion (*iks-i'ōn*), in Greek mythology, father of the Centaurs, who for impudently attempting to win the love of Hera was bound forever to a rolling fiery wheel.

Ixtaccihuatl (*ēs-tā-sē'wū-tl*), extinct volcano, 40 mi. s.e. of Mexico City; height 17,842 ft.: *map* M-133, *picture* M-137

Iye-yasu (*ē'yē yā'su*) (1543-1616), Japanese shogun, one of the Tokugawa family

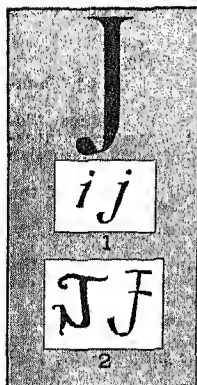
carving from temple stable, *picture* M-231

Izaak Walton League of America, an organization of sportsmen and sportswomen, founded in Chicago in 1922, and now having more than 8000 chapters throughout North America, with the purpose of developing opportunities for the enjoyment of the great outdoors, protecting and restoring woods, wild flowers, and wild life, guarding against pollution of streams, and in general conserving natural resources.

Izalco (*ē-sāl'kō*), volcano in El Salvador S-19

Izmir (*iz-mēr'*), Turkey. See Smyrna

Izmit (*iz-mēt'*), or Ismid (*is-mād'*), Turkey. See in Index Nicomedia



UNLIKE most of our letters, J did not come into existence until toward the end of medieval times. Of all the early peoples who contributed to our alphabet, the Egyptians were the only ones who used a 'j' sound and had a sign for it. The other peoples usually used I where we use J. The Roman name 'Julius', for example, was written with an initial I and pronounced *jul-yus*.

During the 9th century after Christ, Latin writers developed the habit, whenever 'j' was doubled (ii), of adding a tail to the second one (i). On each letter they used a dot, as explained in the Fact-Index article on the letter I. When printing was invented, the 'tailed i' was used as a capital (2). Thus the sign for J came into existence; but it was not used generally for the sound 'jay' until the 17th century. At that time the letter also acquired the pronunciation 'dzh' as in 'jug'.

NOTE.—For the story of how alphabetic writing began and developed, see the articles Alphabet; Writing.

Jab, in boxing B-208

Jabal (*jā'bāl*), Biblical character, son of Lamech and Adah, and a descendant of Cain; "father of such as dwell in tents, and of such as have cattle" (Gen. iv, 20).

Jabalpur (*jāb-āl-pur*). See in Index Jubbulpore

Jabbok (*jāb'ók*), modern Nahr ez Zerka, river in Syria, flows 50 mi. w. to Jordan, about 25 mi. n. of Dead Sea; picturesque scenery.

Jabir ibn Hayyan, Abu Musa, called Geber. See in Index Geber

Jabiru (*jāb'ī-ry*), the name of various large storks
American jabiru S-294: classified S-297

Jacana (*jāh'a-nū*), a small rail-like bird with extremely long toes and claws which enable it to walk on the floating leaves of water plants, and with strong spurs at the bend of each wing; plumage black with usually bright chestnut back and parts of wings; two species are found in tropical America, one of which, the Mexican jacana, ranges north to Texas.

Jacaranda (*jāh-ā-rān'dā*), genus of tropical shrubs and trees (*Jacaranda*) of bignonia family, native to American tropics. One species, green-ebony, grows 30 ft. to 80 ft.; crown rounded. Leaves fern-like; flowers blue, in loose clusters to 8 in. long.

Jacinth, a gem. See in Index Hyacinth

Jacinth, a perennial plant of the lily family; three species are common garden flowers—Japanese jacinth (*Scilla japonica*); Peruvian jacinth (*Scilla peruviana*), also called Cuban lily; Spanish jacinth (*Scilla hispanica*), called bell-flowered squill.

Jack, or yellow mackerel (*Caranx hippos*), excellent and abundant food fish; broad-bodied, dark green above shading to gold on sides and under part; range, e. coast of America, n. to Cape Cod.

Jack, jak, ja'ca, or jackfruit tree, East Indian tree of same genus as breadfruit; wood is hard, yellow, and used for almost every purpose; fruit weighs 5 to 50 lbs.: B-233

Jackal, a dog-like animal J-177, picture H-369

Jackass penguin, picture Z-221

Jackdaw, an Old World crow M-36

Jackfish, pike, or pickerel P-213, F-68, table F-74

Jack Frost F-209-10

Jackfruit. See in Index Jack

Jack Horner, origin M-272

Jack-in-the-pulpit, or Indian turnip, American perennial herb of family Araceae; common in most woods bulb-like stem B-269

"Jack-knife" bridge B-240, picture B-243

Jack-o'-lantern, or Will-o'-the-wisp W-104b

Jack pine, evergreen tree (*Pinus banksiana*) of pine family, native from Nova Scotia and New York to e. British Columbia and Yukon. Low-growing in part of its range, it reaches 80 ft. at western limit. Branches often start near the ground; crown irregular, open-topped. Leaves in twos, 1 in. long, dark green, twisted. Cones small, oblong, to 3 in. long, slightly curved. Sometimes called northern scrub pine. See in Index Lodgepole pine

Jack-rabbits H-222
length of leap H-221

Jacks, Lawrence Pearsall (born 1860), English philosopher; entered ministry as assistant to Stopford Brooke, whose daughter he married; professor of philosophy and principal, Manchester College, Oxford; editor of *Hibbert Journal*, a Unitarian review ('Among the Idol-makers'; 'The Legends of Smokover'; 'The Challenge of Life').

Jacksnipo S-173

Jackson, Andrew (1767-1845), 7th president of U. S. J-177-80
administration (1829-37) J-178-80
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Garrison founds *The Liberator* G-16
Houston serves in Texas H-346
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Hermitage, home J-180
War of 1812 W-10, J-178, A-98/-99
wife W-90

Jackson, Charles Thomas (1805-80), American chemist and geologist; discovered anesthetic property of ether independently of W. T. G. Morton.

Jackson, Calhorne Fox (1807-62), American politician, born Fleming County, Ky.; governor of Missouri 1880-81; became brigadier general in Confederate army
secession attempted M-210

Jackson, Dale, American aviator
record flight, table A-74

Jackson, David E. See in Index Jackson Hole

Jackson, Helen Hunt (1831-85), American poet and novelist, long known as "H. H.," born Amherst, Mass.; her lyric 'Verses by H. H.' won praise from Emerson and other critics; her most famous novel, 'Ramona,' was a plea for justice for American Indians.

Jackson, Henry R. (1820-98), American diplomat and soldier; minister to Austria 1854-58, to Mexico 1885-88; major general commanding all Georgia state troops at beginning of Civil War; later Confederate brigadier general.

Jackson, John Baptist (1701-80), English artist; introduced making of wall paper into England, 1750: W-4

Jackson, May Howard (born 1877) American sculptor, born Philadelphia; awarded Harmon prize 1928.

Jackson, Rachel Donelson Robards (1767-1828), wife of President Jackson W-90

Jackson, Robert Houghwout (born 1892), lawyer and public official, born Spring Creek, Pa.; assistant attorney general of U. S. 1936-38, solicitor general 1938-39, appointed attorney general in President F. D. Roosevelt's cabinet 1940, associate justice U. S. Supreme Court 1941.

Jackson, Thomas Jonathan (1824-63), "Stonewall," Confederate general J-180, C-253, 254

Jackson, William (1759-1828), American soldier, born Cumberland, England; fought in southern campaigns of Revolutionary War; secretary to Constitutional Convention

Key—cape, át, tār, fást, what, fáll; mē, yét, fārn, thēre; ice, bít; rōw, wón, fōr, nót, dō; cūre, bāt, ryde, füll, bārn:

(1787); personal secretary to President Washington 1789-91.
Jackson, Mich., manufacturing and railroad center on Grand River 76 mi. w. of Detroit; pop. 49,656; state prison; automobile and airplane parts, garden tools, radios, rubber products; railroad shops: map M-153
 beginning of Republican party P-292
Jackson, Miss., cap. and largest city of state; on Pearl River 181 mi. n. of New Orleans; pop. 62,107; natural gas wells; cottonseed and lumber products, textiles; Millsaps College, Belhaven College; Campbell and Jackson colleges for Negroes; state schools for deaf and blind: map M-200
 capitol, picture M-202
Jackson, Tenn., trade, manufacturing, and railroad center 80 mi. n.e. of Memphis on Forked Deer River; pop. 24,332; agricultural and cotton interests; railroad shops, lumber, iron and steel products, packed meats; Union University, Lambuth College; Lane College (for Negroes); Federal base in Civil War: map T-46
Jackson, Age of, in U. S. history U-238-9
Jackson Hole, region in n.w. Wyoming, s. of Yellowstone National Park, lying in Snake River valley; area about 400 sq. mi.; named in 1829 for David E. Jackson, partner of the famous fur trader, William Sublette; celebrated in later western stories as a retreat of cattle thieves; now a noted hunting and fishing ground National Monument N-22a
Jackson Lake, Wyo., near w. boundary; 8 mi. long; its outlet is main feeder of Snake River: picture W-192
Jacksonville, Fla., port and railway center; pop. 173,065: J-180-1, maps F-111, 112, picture F-110
Jacksonville, Ill., city 30 mi. s.w. of Springfield; pop. 19,844; Illinois College, MacMurray College for Women; institutes for blind, deaf, dumb, and insane; woolen garments, steel bridges: map I-13
 "Jack Spratt," origin M-272
Ja'cob, Hebrew patriarch, 2d son of Isaac, supplanter of his brother Esau; husband of Leah and Rachel and progenitor of Israelites (Gen. xxv, 1): J-215-16
 burial place F-34
 Joseph his son J-227
Jacobean-illy. See in Index Sprekelia
Jacobean style, of furniture I-100, pictures I-98, 102
Jacobi (já-kō'bē), Abraham (1830-1919), noted American physician, born Germany, called founder of American pediatrics; started clinics throughout New York City for children.
Jacobi, Frederick (born 1891), composer, born San Francisco; assistant conductor, Metropolitan Opera Company 1913-17; teacher of composition, Juillard Graduate School; used Indian melodies in some of his works; wrote music for Jewish religious service.
Jacobi (yá-kō'bē), Karl Gustav Jakob (1804-51), German mathematician, Jewish birth; professor at Königsberg and lecturer at Berlin; made important contributions to higher mathematics.
Jacobi, Moritz Hermann (1801-74), German physicist and architect; said to have constructed first electrically propelled boat.

Jacobins, club of French Revolution-ary period J-181
 Committee of Public Safety F-204
 Lafayette plots against L-54
 Napoleon I and N-6
 Robespierre leads R-117
Jacobites (jāk'ō-bīts), adherents of James II or the direct Stuart line after English Revolution of 1688 uprisings suppressed P-344-5
Jacobs, Joseph (1854-1916), English writer and authority on folk-lore ('English Fairy Tales'; 'Celtic Fairy Tales'): S-303/
Jacobs, William Wymark (1863-1943), English novelist and short-story writer; humorous romances of the sea ('Many Cargoes'; 'Salt-haven'; 'Deep Waters').
Jacob's staff. See in Index Ocotillo
Jacobus Jonker, a diamond D-63
Jacquard (já-kárd') loom, invented by Joseph Marie Jacquard (1752-1834), of Lyons, France S-259, picture S-149
 carpets R-174
 imitation tapestry T-10
 knitting K-33
 lace-making L-47, pictures L-50-1
Jacque (zhák), Charles Emile (1813-94), French etcher and genre painter of the Barbizon school; favored rural scenes and subjects ('Flock of Sheep', in the Louvre).
 "Jacques Bonhomme" (zhák bôn-ôm'), the French peasant F-172, picture F-178
Jacques-Dalcroze. See in Index Dalcroze, Emile Jacques
Jaddassohn (yá-dās-sôn), Salomon (1831-1902), German musical composer and theorist; composed works in nearly every musical form, but best known for works on science of music, which have continued to be used as textbooks.
Jade, a semiprecious stone ranging in color from white to nearly black, most valuable when emerald-green shade; old jade dug from tombs has often turned blue, yellow, red, or brown: G-26, 28
 Burma production B-278b
 chemical composition M-184
 Chinese appreciation G-26, C-2214
Jadette, a variety of jade, most treasured in emerald-green shade; occurs in Burma, and Tibet; chemical formula NaAl (SiO₃): G-28, M-184
Jaeggevarre (yá-güv't-rí), mountain in n. Norway; highest point in Kiolen range, 6283 ft.
Jael (já'el), Hebrew woman exalted in the 'Song of Deborah' as "blessed among women" because she killed Sisera, leader of the Canaanites.
Jaffa (já'fá) (ancient Joppa), port of Palestine on Mediterranean, 35 mi. n.w. of Jerusalem; pop. 70,000; exports wine, oil, and sesame; famous for its oranges: map A-242
 Richard I attacks, picture C-404
Jaffir, or Mir Jaffa, Indian general and ruler C-272
Jagannath (já-án-náth'), also Jagernaut, title of Hindu god, Vishnu; temple at Puri, India; at annual festival idol is drawn by worshippers on enormous car under which devotees were formerly supposed to cast themselves.
Jaganath, India, also Puri, town on e. coast; temple to Jagannath, built in 12th century; pop. 38,000.
Jagellon (yá-jél'on), famous royal family whose members for about 200 years (in 14th, 15th, and 16th centuries) ruled in Lithuania, Poland, Hungary, and Bohemia.

Jaggery, the sugar obtained chiefly from the sap of the East Indian jaggery palms.
Jag'uar, a wild cat J-181, color plate S-206a
 cat family characteristics C-95-6
Jahn (yán), Friedrich Ludwig (1778-1852) German patriot and educator; strove for the awakening of German national feeling by organizing youth of all classes into groups called *Turnvereine* (gymnastic societies); stressed physical fitness, comradeship, patriotism.
Jal-alal (hál'il), or pelota, game said to have been developed from one played by Aztec Indians; introduced into American countries in recent times from Spanish Basque provinces; played in large three-walled court (*fronton*) with small hard rubber balls (*pelotas*) which are hurled with terrific speed against the front wall (also *fronton*) with long, basket-like scoop (*cesta*) attached to hand of player, and returned by others.
Jainism (jín'izm), religious sect in India, founded by Vardhamana Mahavira, an older contemporary of Buddha B-259, I-35
 temple, Calcutta, picture A-329
Jaipur (ji-pur'), a native Rajputana state of India; 15,579 sq. mi.; pop. 2,630,000; chiefly agricultural; some marble, copper, and cobalt.
Jaipur, manufacturing and commercial city in n. cent. India, 150 mi. s.w. of Delhi; pop. 144,000; cap. of native state Jaipur: maps I-30, A-332c, pictures I-28, 32
Jaice (yá'isá), Yugoslavia, town 65 mi. n.w. of Sarajevo; chief outpost of eastern Christendom from 1468 until captured by Turks 1528.
Jak tree. See in Index Jack
Jal'ap, an herbaceous climbing plant (*Ipomoea purga*) with alternate heart-shaped leaves and large purplish-pink flowers; grows in Mexico near the town of Xalapa, whence its name; large root tubers contain a resin used in cathartics.
Jalisco (há-lés'hó), Mexico, state on cent. w. coast; 31,149 sq. mi.; pop. 1,255,000; cap. Guadalajara; corn, wheat, tobacco; cattle; iron and silver; one of the wealthiest Mexican states.
Jaluit (já'ly-ít), island, cap. of Marshall Islands, in Pacific Ocean; 35 sq. mi.; Japanese naval base: map P-10b
Jamaica (já-má'ká), largest island of British West Indies; 4450 sq. mi.; pop. 1,175,000: J-181-2, maps W-72b, C-412
 native houses, picture W-72d
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Jamaica ginger G-88
Jamaica mignonette. See Henna
Jamaica pepper, allspice, or pimento S-249, 250, P-120, picture S-251
 "Trinidad tea" T-27
Jamaica sorrel. See in Index Roselle
James, called in New Testament the "brother of Jesus"; often identified with James the Less; traditional author of Epistle of James.
James, Saint, the Elder (or Greater), son of Zebedee, one of the 12 apostles; festival July 25: A-229
James, Saint, the Younger (or Less), son of Alphaeus, one of the 12 apostles; festival May 1: A-229
James I (1566-1625), king of England J-182-3, S-46
 American colonies A-150, 151
 Bible translation B-103

ü=French u, German ü; gem. ðo; thin, then; ñ=French nasal (Jean); zh=French j (z in azure); k=German guttural ch

Elizabeth aids succession E-258
English language S-98
Gunpowder Plot F-20
New Hampshire grants N-88
opposes use of tobacco T-102
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James II (1633-1701), king of England J-183
capture of New Netherland N-121
Charles II aids succession C-150
decree concerning extent of New York N-124
Marlborough M-65-6
Revolution of 1688 J-183, W-103
A-211: Colonial New York joins N-122
James I (1394-1437), king of Scotland, poet and constitutional reformer; succeeded 1406 while captive in England; released 1424; murdered by rebel nobles.
James IV (1473-1513), king of Scotland; succeeded 1488; killed at Flodden.
James V (1512-42), king of Scotland; succeeded 1513; refused to become involved in policies of his uncle, Henry VIII of England and failed to rout Henry's invading army at Solway Moss (1542) because of lack of support of Scottish nobles; died as result of this humiliation; succeeded by infant daughter, Mary, Queen of Scots; appears in Scott's 'Lady of the Lake'.
James (James Francis Edward Stuart) (1688-1766), "the Old Pretender" P-344
James, Edmund James (1855-1925), American educator, born Jacksonville, Ill., president Northwestern University, 1902-04; University of Illinois, 1904-20; active in civic and educational affairs.
James, Henry (1843-1916), Anglo-American novelist and essayist; born New York City; became British subject, 1915; writings refined and subtle but involved and artificial in style; brother of William James; best works 'Daisy Miller', 'Portrait of a Lady', 'The Finer Grain', 'The American'; A-180, N-183, picture A-180
James, Jesse Woodson (1847-82), notorious American outlaw, born in Clay County, Mo.; reared as farmer boy; with brother, Alexander Franklin, joined Confederate guerrillas to combat raids of Federal militia; 1868 formed outlaw band which specialized in bank and train robberies; while hiding in St. Joseph, Mo., treacherously shot in back by two members of his band, Robert and Charles Ford, for the sake of reward of \$10,000 offered for his capture or death.
James, Thomas (1782-1847), American trader and trapper; with Missouri Fur Company's first expedition (1809) and later with Andrew Henry in Wyoming; made trading expedition to Santa Fe (1821) with John McKnight by way of Mississippi and Arkansas rivers; another expedition (1822) to perilous Comanche territory, now Oklahoma; member of Illinois legislature (1825-27).
James Will (Iam Röderlek) (1892-1942), American writer and artist born near Great Falls, Mont.; left an orphan and adopted by fur trader; ranch life and horses his specialty; illustrated his own books; awarded Newbery Medal

for 'Smoky' 1927 ('Sand'; 'Cowboys North and South'; 'Horses I've Known'; 'American Cowboy'; 'Big Enough'; 'Lone Cowboy', an autobiography).
James, William (1842-1910), American psychologist, born New York City; brother of Henry James; brilliant, original and highly readable philosopher ('Principles of Psychology', 'Varieties of Religious Experience'; 'Pragmatism'); A-180 philosophy P-173
'Principles of Psychology' P-362
quoted: on adolescence A-22; habit H-193; philosophy P-172, 173
James, Epistle of, book of the New Testament, addressed by James "the Lord's brother," from Jerusalem to twelve tribes of the Dispersion, inculcating practical morality.
James Bay, Canada, southern arm of Hudson Bay, about 300 mi. long and 160 mi. wide, named for Thomas James, English navigator who explored it in 1631-32; map C-50c
Radisson finds old forts F-224
James Island, island in Charleston harbor, S. C.; once a peninsula, action of sand formed island.
James Millikin University, at Decatur, Ill.; Presbyterian; founded 1901; liberal arts, engineering, fine arts, commerce and finance, music, household arts, and nursing.
Jameson (jām'son), Sir Leander Starr (1853-1917), Scottish physician, leader of "Jameson raid" on the Transvaal (1895); "lived it down" to become leader of South African Progressive party and prime minister (1904-08) of Cape Colony
raid T-127; Rhodes aids R-99
Jameson, Storm (Mrs. Guy Chapman) (born 1897), English novelist; her 'Three Kingdoms' deals with the problem of marriage and a career for women; 'The Lovely Ship', 'The Voyage Home', and 'A Richer Dust' are related novels concerning the life of a Victorian woman; 'Europe to Let' and 'Cousin Honore' treat Nazi domination of Europe.
James River, or Dakota River, rising in e. cent. North Dakota, flowing through South Dakota to Missouri River; length 500 mi.; maps N-182, S-218
James River, Va., 420 mi.; expands into estuary 50 mi. long flowing through Hampton Roads into Chesapeake Bay; J-183, map V-308
Richmond on R-106
Jamestown, N.Y., summer resort and manufacturing city on outlet of Chautauqua Lake, 58 mi. s.w. of Buffalo; pop. 42,638; wood and metal furniture, metal doors and interior trim, textiles; map N-114
Jamestown, N.D., city on James River, 80 mi. w. of Fargo; pop. 8790; trading center of agricultural and stock-raising region; Jamestown College; map N-162
Jamestown, Va., first permanent settlement made by English in America; J-183, V-307, A-153
Bacon's Rebellion B-11
Colonial National Historical Park N-21, V-307, Y-207, picture V-308a
first glass made in U. S. G-108
schools E-175
settlement celebrated (May 13) E-320
Smith, Captain John S-185
Jamestown College, at Jamestown, N. D.; Presbyterian; reopened 1909 (first organized 1883 but closed 1898); arts and science, music, public speaking, commerce.

Jamestown Island, small island in James River near site of ruined village of Jamestown; about 8 mi. from Williamsburg; part of "Colonial National Monument" connected by parkway with Williamsburg and Yorktown.
Jammes (zhām), Francis (1868-1938), French Catholic poet; wrote simply of everyday life ('Les Géorgiques chrétiennes'); F-198
Jammu and Kashmir, state in n. India, See in Index Kashmir
Janáček (yā'n'a-chek), Leoš (1854-1928), Czech composer, horn Moravia; outstanding compositions are choral works ('Our Father'; 'The Eternal Gospel') and operas ('Jenufa'; 'Katya Kabanova').
Jannaschek (yā'nou-shék), Fanny (1830-1904), American tragic actress, born Bohemia (McG Merrills, Mary, Queen of Scots, and Shakespearean rôles).
Jane Eyre (ér), plain, shy governess, heroine of Charlotte Brontë's 'Jane Eyre'.
Janesville, Wis., industrial center on Rock River, 79 mi. s.w. of Milwaukee in rich dairying region; pop. 22,992; trade in tobacco, grain, and sugar beets; textiles, motors, fountain pens; state school for blind; map W-124
Janiculum (jā-nik'ya-lūm), ancient name of Monte Gianicolo (mōntā jī-nē'kō-lō), hill in Rome, on right bank of Tiber; lookout post in story of Horatius T-88
Janinet (zhā-nē-nē'), Jean-François (1752-1814), French engraver, specializing in color engraving E-298
Janis (jā'n'is), Elsie (born 1889), American actress noted for clever impersonation; born Columbus, Ohio; appeared in 'The Belle of New York' (1904), 'The Fortune Teller', 'Elsie Janis and Her Gang'; married Gilbert Wilson 1932.
Janissaries (jā'n'i-sā-rīz), or Janisaries, a powerful military force of Turkish Empire; suppressed 1826 by Mahmud II; T-162
"Jan-kem-po," Japanese game J-193
Jankó (yāng'kō), Paul von (1856-1919), a Hungarian pianist; inventor of Jankó keyboard; P-212
Jan Mayen (yān mē'n) Island, island between Iceland and Svalbard officially incorporated in Norwegian state, 1929; discovered by Henry Hudson, 1607; rediscovered by Jan Mayen, Dutchman, a little later; 34 mi. long, 9 mi. wide; wireless station and weather bureau built 1921 by Norway; center of whaling and sealing expeditions.
Jannings (yān'jings), Emil (born 1886), German-American motion picture actor, born Brooklyn, N. Y. of German parents and taken to Europe at age of two; returned to U. S. after winning fame as character actor in German films ('The Last Laugh'; 'Variety'; 'The Way of All Flesh'; 'The Patriot').
Jannsen, Werner (born 1900), musical conductor and composer, born New York City; conducted European and American symphony orchestras; began as composer of popular music; later composed symphonic poem 'New Year's Eve in New York', chamber works, and scores for motion pictures.
Jan'sen, or Janse'nus, Cornelius (1585-1638), Dutch theologian, bishop of Ypres, founder of Jansenism.
Jan'senism, a doctrine concerning

predestination and limitations of free will, named for Cornelius Janssen; intended to reform Catholicism, defended by Pascal but condemned by several popes as heresy; rent France in 17th and early 18th centuries.

Janssen, Geraert. *See in Index* Johnson, Garret

Janssen (zhân-sân'), Pierre Jules César (1824-1907), French astronomer; discoverer of helium in sun: S-242

Januar'ius, Saint (San Gennaro), martyr and patron saint of Naples; bishop of Benevento; lived about close of 8d century; two phials believed to contain blood of martyr are preserved in cathedral at Naples; relics are shown twice a year when the blood liquefies; commemorated September 19.

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birthdays of famous persons. *See in Index* Anniversaries and birthdays, *table*
birthstone G-25
holidays H-320; foreign H-322

Ja'nus, in Roman mythology, two-faced god J-163

Janvier (jân'vi-ä'), Thomas Ailbone (1849-1913), American historical writer, born Philadelphia; years spent in Colorado and Mexico provided background for his best-known works ('Aztec Treasure House'; 'Stories of Old Spain'; 'In the Sargasso Sea').

Japan, island empire of Asia; 260,000 sq. mi.; pop. 100,000,000; cap. Tokyo: J-184-95, maps J-186, A-332a, b-c, Outline J-195
agriculture J-187-88a, *Outline* J-195
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Japan, Sea of, part of Pacific Ocean between Japan and Asia: area 389,100 sq. mi.; mean depth 4428 ft.; maps J-186, A-332a, b
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Japan Current, or Kuro Shio (Japanese "black current"), a warm current from Japan J-186d, O-200
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Japanese Alps, term applied to mountains in cent. Japan, *picture* J-186c
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Japheth (jâ'fêth), or Japhet, third son of Noah.
Japurá (zhâ-pâ-râ') River, also called Caqueta River and Yapurá River, one of chief tributaries of Amazon, rising in Colombian Andes; 1800 mi.; maps C-305, B-226
Jaques (jâ'kwêz), in Shakespeare's 'As You Like It' A-323
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Jardin des Plantes (zhâr-dân' dâ plân'), famous botanical garden in Paris, France
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Jar'gon, or Jargon', name given to green, blue, and colorless varieties of zircon used as gems G-20
Jarl (yâr'l), Norse title N-169
Jarnac (zhâr-nâk'), France, town 60 mi. n. of Bordeaux; pop. 4000; scene of Duke of Anjou's victory over Huguenots in 1569: C-300
Järnefelt (yê'r'nî-fêll), Edvard Armas (born 1869), Finnish musician; one of representative Finnish composers; compositions for orchestra, piano, choral works, songs.
Jar'rah tree, a eucalyptus E-315
Jarvis, Anna, born West Virginia,

- known for activities in connection with Mother's Day: H-322
- Jarvis Island**, a tiny sand and coral island in Pacific, about 1800 mi. s. of Honolulu; colonized by U. S. in 1935 as way-station for land planes flying from Hawaiian Islands to Australia.
- Jasione** (*jás-i-ō'nē*), a genus of annual or perennial plants of the bell-flower family, native to Europe; flowers blue or white, grow in heads united by whorl of tiny leaves (involucre). Shepherd's-scabious or sheep's-bit (*J. perennis*) has long-stalked globular heads of blue; used in rock gardens.
- Jas'mine**, a garden shrub J-202-3
- Jasmine**, cape. See in *Index* Gardenia
- Jason**, in Greek mythology, leader of Argonauts A-281-2
- Jasper**, William (1750?-79), American Revolutionary soldier, hero of many romantic exploits, especially the rescue (1776) of the colors at Fort Moultrie; refused to accept commission because uneducated.
- Jasper**, a yellow, semiprecious, non-crystalline form of quartz G-28
- Jasper National Park**, Alberta, Canada N-23
- Jasperware** P-332, picture P-335
- Jassy** (*yás'sē*), or Iasi (*yá'shē*), Rumania, trade city of Moldavia, former capital, 200 mi. n.e. of Bucharest; university; important cultural and political center; pop. 105,000; maps B-18, E-326e
- Jastrow** (*jás'trō*), Joseph (1863-1944), American psychologist, born Poland, brother of Morris Jastrow; professor of psychology, University of Wisconsin, 1886-1927 ('Character and Temperament'; 'Keeping Mentally Fit').
- Jastrow**, Morris (1861-1921), American Orientalist, born Poland; professor of Semitic languages, University of Pennsylvania ('The Civilization of Babylonia and Assyria', 'Zionism and the Future of Palestine').
- Jats** (*játs*), or Jauts, a people of n.w. India; about 9,000,000: G-5
- Jaune**, famille (*já-mě'yū shōn*), a Chinese porcelain P-331
- Jaunpur** (*jān-pur*), a city in n.e. India on Gumbi River, 84 mi. n.w. of Benares; pop. 38,000; once a magnificent Mohammedan capital.
- Jaunting car**, Irish, picture I-125
- Jaurás** (*zhō-rés*), Jean (1859-1914), French socialist, ardent defender of Dreyfus, strong opponent of militarism; with Aristide Briand founded newspaper 'l'Humanité'; assassinated by fanatic because of his opposition to French participation in the 1st World War.
- Jauts**. See in *Index* Jats
- Java** (*já'vā*), island in Netherlands Indies; 48,504 sq. mi.; pop. 39,765,000; cap. Batavia: J-203-5, maps E-142, A-332c
- ape-man M-48
- arts and crafts: batik printing D-122, T-86, picture A-327; metal work M-124; puppets P-388c
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- puppets P-388c
- shelter, pictures J-203, E-142c, 143
- Java Sea**, part of Pacific n. of Java, s. of Borneo, maps E-142, A-332c
- Javelin** (*jáv'lin*), in ancient and medieval times, a spear used in war and in hunting machine for hurling, picture F-29
- Javelin**, in modern athletic games, a wooden spearlike shaft about 8½ ft. long hurled for distance.
- Javelle water** C-177
- Jaw**
- birds B-120
- broken, first aid F-65
- fish F-70
- grasshopper G-138
- human S-156, pictures T-29
- insects I-87, pictures I-82
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- snakes S-171
- Jaxartes** (*jáks-úr'táz*) River, ancient name of river Syr Darya. See in *Index* Syr Darya
- Alexander the Great at A-115
- Jay**, John (1745-1829), American jurist and statesman J-205-8
- defends Constitution U-209
- Jay's Treaty (1794) J-208, A-246; criticized by Monroe M-240
- Jay**, common name of several birds of family *Corvidae*, including blue jay, European jay, Canada jay, Florida jay, California Jay: B-160
- Jayavarman III** (9th century), king of Cambodia, Indo-China builds Angkor Thom A-332
- Jayhawkers**, guerrilla fighters; came to be applied especially to Kansans; used in Civil War for Unionist guerrilla fighters.
- Jayhawker State**, popular name sometimes applied to Kansas.
- Jay's Treaty**, between United States and Great Britain (1794) J-206, A-246
- criticized by Monroe M-240
- Jazz music** M-316-17
- Negro origin N-63, M-318
- primitive form, picture M-309
- resemblance to savage types M-308
- Jean**, a heavy twilled cotton fabric resembling drill but more closely woven and finer; woven in white, plain colors, or stripes; also called middy twill.
- 'Jean-Christophe'** (*zhān krě-stōf*), novel by Roland F-198, N-183
- Jeannes**, Anna Thomas (1822-1907), American philanthropist, born Philadelphia, Pa.; Quaker; large donations to Philadelphia institutions. See also in *Index* Negro Rural School Fund
- Jeanie Deans**, heroine of Scott's 'Heart of Midlothian' S-51
- Jeanne d'Arc** (*zhān dārk*). See in *Index* Joan of Arc
- Jeanneet-Gris**, Charles Edouard. See in *Index* Corbusier, Le
- Jeannette** (*jě-nét*), Pa., borough 26 mi. s.e. of Pittsburgh; pop. 18,220; in agricultural, coal-mining, and natural gas region; glass, foundry, and rubber products.
- 'Jeannette' Expedition**, American Arctic expedition 1879 under Lieutenant-Commander De Long; the *Jeannette* was crushed in ice n. of Siberia; De Long and two-thirds of crew reached shore in boats, but half of them, including De Long, died of starvation; discovery 1864 of some possessions of crew on s. w. coast of Greenland substantiated theory of continuous Arctic current.
- Jean Paul**. See in *Index* Richter, Johann Paul Friedrich
- Jeanron** (*zhān-rōn*), Philippe Auguste (1807-77), French genre, landscape, and historical painter; improved and expanded collection in Louvre while in charge of museum; founded Luxembourg Museum; art critic ('Isle of Calypso'; 'Mira-beau').
- Jeans**, Sir James Hopwood (born 1877), British physicist, astronomer and mathematician; lecturer on mathematics at Oxford and Cambridge; taught at Princeton; research associate at Mount Wilson Observatory, 1923. Has written many books; 'The Universe Around Us' and 'The Mysterious Universe' explain modern astronomy for the average reader
- tidal theory of solar system P-233
- Jean Valjean** (*zhān vāl-zhān*), hero of 'Les Misérables', a novel by Victor Hugo H-354
- Jebavy** (*yěb-ā-vě*), Václav. See in *Index* Brezina, Otakar
- Jebb**, Sir Richard C. (1841-1905), brilliant Scottish classical scholar quoted G-172
- Jeb'el**, Arabic word for mountain.
- Jebel Arashi**, in Morocco; highest peak in n. Africa (14,600 ft.).
- Jebel-es-Sheikh**, Arabic name for Mt. Hermon, Syria, 30 mi. s.w. of Damascus; 9400 ft.
- Jebel Jermak** (*jěb'el jěr'māk*), in upper Galilean mountains; highest point in Palestine proper, 3934 ft.
- Jebel Neba**, near Dead Sea (2650 ft.), probably ancient Nebo, a mountain in Palestine whence Moses saw the Promised Land.
- Jebel Shammur**, province of Arabia A-240, map A-242
- Jecker** (*zhě-kēr*), Jean Baptiste (1810-71), Swiss banker whose extensive holdings of land in Mexico involved France in quarrels with Mexico, and were a cause of intervention by Napoleon III.
- Jedda**. See in *Index* Jidda
- Jeejeebhoy** (*jě'jē-boi*), Sir Jamestjee (1788-1859), Indian merchant and philanthropist, born in Bombay of Parsee parents; famed for philanthropy among all sects and nationalities in India; given knighthood and baronetcy by England.
- Jeep**, in U. S. Army, a midget ¼-ton combat car carrying 8 to 6 men, antitank guns, mortars, and machine guns up to 800 lbs.; mobility and high speed make it valuable in attack and reconnaissance work.
- Jeffers**, Robinson (born 1887), American poet, born Pittsburgh, Pa.; work shows rugged strength, tragic, often violent intensity of passion 'Roan Stallion'; 'Cawdor'; 'Give Your Heart to the Hawks'.
- Jeffers**, William M. (born 1876), railway official, born North Platte, Neb.; president Union Pacific R.R. after 1937; made U.S. rubber administrator 1942: N-129, 13, picture N-129
- Jefferson**, Joseph (1829-1905), actor, born Philadelphia, famous in 'Rip Van Winkle': picture D-97
- Jefferson**, Martha Wayles Skelton (1749-82), wife of President Jefferson W-89
- Jefferson**, Thomas (1743-1826), 3d president of U. S. J-206-9
- Adams, John and A-14
- administrations (1801-09) J-206, 209, U-238
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- Lewis and Clark Expedition F-14, L-99-100

Key—cāpe, át, fār, fāst, whāt, fāll; mē, yēt, fērn, thēre; íce, bít; rōw, wón, fōr, nót, dō; cūre, bāt, ryde, fūll, bārn;

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Jefferson, Meunt, Oregon, peak in Cascades, its top covered with perpetual snow; 10,495 ft.; map O-246
Jefferson, Territory of, later Colorado Territory C-314
Jefferson Barracks, St. Louis S-10
Jefferson City, Mo., state capital, on s. bank of Missouri River in center of state; pop. 24,268; varied manufactures, commercial center for agricultural and rich mineral region; map M-208, picture M-208
Jefferson River, headstream of Missouri River in s.w. Montana; flows n.e. 140 mi.; map M-243
Jeffersonville, Ind., port on Ohio River opposite Louisville, Ky. and connected by \$6,000,000 bridge; pop. 11,493; railroad cars, soap and perfumes, fertilizer; U. S. quartermaster supply depot; map I-46
Jeffery, Walter James (1861-1922), Australian journalist and author; seaman; edited papers in Sydney; wrote historical romances ('A First Fleet Family', with Louis Beoke; 'A Century of Our Sea Story').
Jeffreys, George, Baron (1648-89), English judge, chief justice, and later lord chancellor under James II; notorious for brutality in "bloody assizes."
Jeffreys, Harold (born 1891), British astronomer, theory of origin of solar system P-233
Jeffries, James J. (born 1875), American boxer; born Carroll, Ohio; world's heavyweight champion 1899-1906; B-210
Jehan, Shah. See in Index **Shah Jehan**
Jehlam River. See in Index **Jhelum**
Jehoshaphat. See in Index **Joash**
Jehol (rō'hō', also yō'hō'), province and city in Manchukuo; city former summer residence of Manchu emperors: M-51, maps M-49a, J-188 history M-49, 49a, b, C-221n
Jehoshaphat (jō-hōsh'ā-fāt), son of Asa and king of Judah, 9th century B.C.
Jehovah (more properly Yahweh), the Hebrew name for the God of Israel; means the "self-existent" or "unchangeable One"; in English generally rendered "the Lord."
Jehu (jō'hū), king of Israel; killed Jezebel and massacred house of Ahab (II Kings ix-x), enemy of Baal worshippers; furious driver, hence, nickname of coachman.

Jekyll (jē'kīl), Dr., the kindly reputable physician in R. L. Stevenson's 'Strange Case of Dr. Jekyll and Mr. Hyde', who discovers a drug by which he can transform himself into the loathsome embodiment of his worse self, the criminal ruffian Hyde.
Jellicoe (jē'lī-kō), Jahn Rushworth Jellicoe, first Earl (1859-1935), British admiral, entered Navy 1872; in command of Grand Fleet in first World War, notable services at Battle of Jutland; first sea lord, and chief of naval staff; admiral of the fleet, 1919; governor general of New Zealand, 1920-24 battle of Jutland W-158, B-70
Jelly, fruit
 canning C-74
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Jellyby, Mrs., false philanthropist in Dickens' 'Bleak House', who neglects her family to help the natives of Borrioboola Gha.
Jelly-fish, a primitive coelenterate animal J-209-10
 nervous system, photograph N-64a
Jelutong (zhē-lū-tōng'), or pontianak, name of a Malayan tree, also of its rubber-like juice G-190
 chewing gum C-185
Jemappes (zhū-māp'), village in Belgium 8 mi. s.w. of Mons; decisive defeat of Austrians by French Revolutionary Army 1792.
Jemez (hā'mās), a pueblo of a tribe belonging to the Tanoan stock of Indians, on Jemez River, N. Mex.
Jena (yā'nā), Germany, famous university town of Saxe-Weimar on Saale River 45 mi. s.w. of Leipzig; pop. 53,000
 glass production G-105
Jena, battle of (1806) N-8
 effect in Prussia G-72
Jena, University of, one of the chief German universities, founded about 1558; noted for its many distinguished teachers, including Fichte, Schelling, Hegel, Schiller, Haecckel, and Eucken; identified with liberal movement in theology.
Jenghiz Khan. See Genghis Khan
Jenifer, Daniel of St. Thomas (1723-90), American statesman, born Charles County, Md.; member of Continental Congress (1778-82); favored permanent union of states and congressional power of taxation; delegate to Constitutional Convention (1787).
Jenkins, Charles Francis (1867-1934), American inventor, born near Dayton, Ohio; took out more than 400 patents, chiefly in field of motion pictures and radio
 motion picture projector M-290
 television T-41
 "Jenkins' Ear, War of," declared by England against Spain in 1739; soon merged with the War of the Austrian succession: L-180
Jenks, Jeremiah Whipple (1856-1929), American educator and political economist, born St. Clair, Mich.; professor of political economy and politics, Cornell University, 1891-1912; served U. S. and other governments in administrative and advisory positions ('The Trust Problem', 'Principles of Politics').
Jenner, Edward (1749-1823), English physician, discoverer of cowpox vaccine for smallpox (1798); student of John Hunter; spent years after discovery spreading knowledge and practice of vaccination; awarded total of \$150,000 by Parliament: V-267

Jenney, William LeBaron (1832-1907), American architect
 steel-skeleton buildings B-203
Jennings, Sarah, Duchess of Marlborough (1660-1744), favorite of Queen Anne M-65, 66
Jennings, La., town in s.w., 90' mi. w. of Baton Rouge; pop. 7843; natural gas and petroleum.
Jenny, spinning, invented by Hargreaves H-224
 improved by Crompton C-400
 'Jenny Jones', English folk-song F-134
Jenson, Nicolas (died 1481), Italian printer, born in France; probably learned printing at Mainz from Gutenberg; printed at Venice ten years; his roman type, long considered the finest, used as model by Morris, Cobden-Sanderson, Rogers, and other designers: T-174, chart B-177
Jephthah (jē'fthā), judge of Israel who, in fulfillment of a rash vow, sacrificed to the Lord the first creature that met him on return from victory, his only daughter (Judges xi).
Jerba, French island off e. coast of Tunisia, n. Africa; 425 sq. mi.; estimated pop. 90,000, mostly Berbers; the loins-eaters' island of Greek and Roman geographers.
Jerbo'a, a ratlike animal R-51, K-1, picture A-33
Jeremi'ah (7th century B.C.), one of the major Hebrew prophets, last before the exile; Book of Jeremiah is one of the greatest and longest of the Old Testament prophetic books; prophesied disaster to Judah: P-352
Jerez (or Xeres) de la Frontera (hā-rath', old pronunciation shā'ās or shēr'ēs, dā-lā-frōn-tā'rā), Spain, old city in s., 14 mi. n.e. of Cadiz; pop. 77,000; famous for sherry wine, to which it gave the name: map S-226 battle (711) S-229
Jericho (jēr'ī-kō), important city of ancient Palestine 7 mi. n. of Dead Sea; captured and destroyed by Joshua (Joshua vi, 20-4); now small village (Arabic, Eriha): P-33
Jericho, rose of, or resurrection plant C-2
Jeritza (yēr'it-sā), Maria (born 1893), Austrian operatic soprano; made debut at 16 as Elsa in 'Lohengrin'; sang in Imperial Opera, Vienna, Paris Opera, and Metropolitan, New York; created leading roles in Strauss's 'Ariadne' and 'Egyptian Helen'.
Jerked beef M-248
Jeroboam I, leader of revolting 10 tribes and first king of Israel (10th century B.C.) after separation from Judah (I Kings xii, 20) J-218
Jeroboam II (8th century B.C.), king of Israel, son of Joash, regained much territory previously lost (II Kings xiv, 23-9); Amos and Hosea preached during his reign.
Jerome, Saint (Hieronymus) (340?-420), most learned of early Fathers of Latin church; born Strido, Dalmatia, of wealthy family; festival September 30
 translates Bible B-103
Jerome, Chauncey (1793-1860), New England clock-maker W-39
Jerome, Jerome K. (1859-1927), English humorist and dramatist ('Idle Thoughts of an Idle Fellow'; 'The Passing of the Third Floor Back'; 'Three Men in a Boat').
Jerome, Ariz., town on Verde River, 22 mi. n.e. of Prescott; pop. 2295; copper production: map A-289

u=French u, German ü; jem, jo; thln, then; n=French nasal (Jean); zh=French j (z in azure); k=German guttural ch

- Jerome of Prague** (died 1418); learned and eloquent Bohemian religious reformer, friend of Huss H-363
- Jerrold, Douglas** (1803-57), English dramatist and humorist ('Black-Eyed Susan', 'The Heart of Gold', plays; 'Chronicles of Clovenhook', novel).
- Jersey**, largest of Channel Islands, 20 mi. from French coast; 45 sq. mi.; pop. 50,000; chief city St. Helier: C-139, map E-270a
- Jersey cabbage**, tree-like plant of the cabbage family C-1
- Jersey cattle** C-104, D-2 brought to U. S. A-53
- Jersey City**, N. J., manufacturing city on Hudson River opposite New York City; pop. 301,173: J-210-11, map N-90
- largest clock in U. S. W-37
- tobacco manufactures T-104
- Jersey cloth** T-71
- Jersey tea**, or wintergreen, a creeping evergreen plant W-114
- Jerusalem**, Palestine, ancient capital of the Hebrew nation and capital of modern Palestine; pop. 135,000: J-211-12, maps A-242, A-332b, B-6
- brass-workers, picture C-360
- flag of the Middle Ages F-97, color plate F-86
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- Omar, Mosque of J-211, picture A-329
- Wailing Wall J-211, P-36, picture J-212
- Jerusalem artichoke** A-318
- alcohol from P-245b
- Jerusalem-cherry**, a perennial shrubby plant (*Solanum pseudo-capsicum*) of the nightshade family, native to Europe. Leaves narrow, glossy on upper surface; flowers white; fruit globular, scarlet or yellow. A variant of this has pointed orange fruits.
- Jerusalem cross**, or scarlet lychula (*Lychnis chalcedonica*), a stout perennial garden herb of the pink family with ovate leaves and clusters of scarlet flowers
- how to plant G-11
- 'Jerusalem Delivered'**, epic by Tasso T-18, I-154
- Jerusalem-thorn**, or horse-bean, small tropical tree (*Parkinsonia aculeata*) of pea family, native to S. U.S. and Central America. Grows 15 ft. to 80 ft.; thorny, with leaves divided into many small leaflets; flowers fragrant, yellow, in loose clusters. Used as hedge plant.
- Jervis Bay**, New South Wales, 100 mi. e. of Canberra; federal port and naval college.
- Jespersen (jēs'pēr-sən)**, Jens Otto H. (1880-1943), Danish philologist; professor, University of Copenhagen ('Phonetics', 'Growth and Structure of the English Language', 'Modern English Grammar').
- Jessamine**, alternative name for jasmine.
- Jessamine**, Carolina yellow, common name of gelsemium. See in Index Gelsemium
- Jesse (jēs'ē)**, father of David; "the tree of Jesse," a favorite medieval church emblem, represents Jesse as the root and the Savior or Virgin and Child as the supreme flower (Isaiah xl, 1, 10).
- Jesses**, in falconry F-7, picture H-247
- Jes'sica**, Shylock's fair daughter who elopes with Lorenzo in Shakespeare's 'Merchant of Venice' M-119
- Jessup**, Walter Albert (born 1877), American educator, born Richmond, Ind.; president, University of Iowa, 1916-34; made president Carnegie Foundation for Advancement of Teaching 1934.
- Jesters, or Fools, Court**, men kept in households of kings and other dignitaries to amuse. They became prominent in Europe in the Middle Ages and were known by their peculiar gaily colored costumes with bells. "The Fool" in Shakespeare's 'King Lear' is one of most famous in literature.
- Jesuits (jēs'yū-its)**, or Society of Jesus, religious order founded by Loyola: L-211
- Catholic Reformation and R-65, 67, L-211
- educational work E-174
- Marquette in America M-67
- spread use of quinine Q-8
- Xavier one of the founders X-197
- Jesus Christ**, founder of Christianity J-213-14. See also in Index Christianity
- 'Adoration of the Shepherds', Dürer, picture C-229
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- birth date C-23; celebration C-228
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- Infant Jesus Riding on a Lamb', picture B-155
- 'Jesus in the Temple', picture J-213
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- 'The Last Supper' V-300, picture V-299
- Wandering Jew and W-6
- washes feet of disciples, picture P-15
- Jesus College**, Oxford O-260
- Jot**, a mineral G-28, C-284
- medicinal use G-26
- Jetsam**. See in Index Flotsam
- Jetté (shé-tā')**, Sir Louis Amable (1838-1920), Canadian statesman and jurist; lieutenant governor Quebec 1898-1908; chief justice province of Quebec 1909-11
- Alaskan boundary commission R-150
- Jetty**, an embankment used to direct or strengthen current or shelter a harbor J-214
- flood control aided by F-108c
- Galveston G-3
- Jevons**, William Stanley (1835-82), English economist and logician; brilliant writer of wide influence; developed theory of utility; simplified logic ('Treatise on Logic', 'Theory of Political Economy').
- Jew, the Wandering** W-6-7
- Jewel Cave**, national monument in South Dakota N-22a
- Jewel of the veldt**. See in Index Ursinia
- Jewelry** G-25-6, picture G-27, color plate G-27a-b. See also in Index Gems
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- savage: Australia, picture A-368; Borneo, picture B-196
- watches as, picture W-40
- Jewels**. See in Index Gems
- Jewels**, in watches W-39
- 'Jewels of the Madonna'**, opera by Wolf-Ferrari, story O-230
- Jewel weed**, a common wildflower of the genus *Impatiens* of the balsam family; stems succulent; leaves usually alternate; flowers brownish-orange or yellow spotted, similar to snapdragon; found in moist places; also called touch-me-not seed W-64
- 'Jewess, The' ('La Juive')**, opera by Halévy, story O-230
- Jew'ett**, Sarah Orne (1849-1909), American short-story writer and novelist, born South Berwick, Me. ('The King of Folly Island'; 'Tales of New England'; 'The Country of the Pointed Firs'—exquisite studies of New England character).
- Jewfish**, immense grouper reaching a length of 6 feet or more and weighing 500 or 600 pounds, frequenting all warm seas; among the most common are the California jewfish, the spotted jewfish of the West Indies, and the black jewfish of Florida; excellent food-fish.
- Jewish Autonomous Territory**. See in Index Birobidjan
- Jewish Welfare Board**, national organization of Young Men's Hebrew Associations, Young Women's Hebrew Associations, and Jewish Community Centers; headquarters in New York City; founded 1917 to promote social, religious, and educational welfare of Jews in military service, it has since greatly extended its activities.
- 'Jew of Malta'**, tragedy by Christopher Marlowe; chief character, the avaricious Barabas, is believed to have been pattern for Shakespeare's Shylock.
- Jews, or Hebrews**, "the children of Israel" J-215-18. See also in Index Jerusalem; Palestine
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- marriage M-66, 69, F-8
- Morocco M-260

Key—cāpe. āt. fār. fāst. whāt. fāll; mē, yēt, fērñ, thērē; īce, bīt; rōw, wōn, lōr, nōt, dā; cūro, bāt, ryde, fūll, bārñ;

- music; ancient M-309, 317
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 racial affinity, *diagram* R-9b
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 Zionist movement J-218, J-212, P-36
Jew's harp, musical instrument M-323
Jez'ebel, idolatrous wife of Ahab, cursed by Elijah for treachery to Naboth (I Kings xxi) and murdered by Jehu (II Kings ix, 30-7).
Jezreel (*jēz'rē-ēl*), ancient city in plain of Jezreel, 50 mi. n. of Jerusalem; capital of Israel under Ahab; modern town, Zerin; important excavations in vicinity.
Jholum (*jā'lūm*) River, also Jehlam, ancient Hydaspes, flows s.w. from Himalayas into Chenab River in n. India (450 mi.); *picture* R-110
 Vale of Kashmir K-8
Jib, a sail S-119, B-164
Jib'boom, of ship, *picture* S-119
Jibing, in sailing, *diagram* B-185
Jibuti'. See in *Index* Djibouti
Jicarilla (*hē-kā-rēl'yā*), an Apache Indian tribe, formerly ranging far, but now on a reservation in New Mexico; named by the Spaniards for the "little baskets" they made.
Jičin (*yē'chēn*), or Gitschin, town in Bohemia, Germany, 48 mi. n.e. of Prague; pop. 11,000; Prussian victory over Austrians 1866.
Jidda (*jīd'ā*), or Jedda, Saudi Arabia, chief seaport of Hejaz, on Red Sea; pop. 30,000; principal income derived from great numbers of pilgrims on way to Mecca: A-240, 241, *map* A-242
 gateway, *picture* A-239
Jig, a sprightly, gay dance; performed by one or more persons in irregular steps with sharp, somewhat jerking, movement. The Irish jig is a national folk-dance of Ireland.
Jigger, chigger, chigoo, or red-bug, a parasitic mite S-258, *picture* P-68
Jigger, machine used in pottery making P-328, *picture* P-329
Jig-saw, a form of band-saw F-222
Jim Crow, name given to laws of the Southern states of U. S. which provide for the separation of Negroes and white people in street cars, trains, schools, and theaters. "Jim Crow" is an old nickname for a Negro, popularized in a song.
Jiménez (*hē-mā'nāth*), Juan Ramón (born 1881), Spanish poet; exquisitely sensitive and melancholy; has been compared to Maeterlinck and Rossetti.
Jiménez de Cisneros, Francisco. See in *Index* Ximenes de Cisneros
Jimmu Ten'uo, or "Son of Heaven" (7th and 6th century B.C.), legendary founder of the line of Japanese mikados, descendant of the sun-goddess and first ruler of Japan.
Jimson weed, thorn-apple, or stink-weed, *Datura stramonium*; an annual with large, sweet-smelling, white, trumpet-shaped flowers; contains strong narcotics; named jimson for Jamestown, Va.: P-274, *picture* P-273
Jinghis Khan. See Genghis Khan
Jingle, Alfred, smooth-mannered swindler in Dickens' 'Pickwick Papers', *picture* D-67
Jin'go (2d and 3d century A.D.), legendary warlike empress of Japan, on whose alleged conquest of Korea Japan bases traditional claims of suzerainty over that country.
Jingo, a person who advocates an aggressive, warlike policy in support of national ambition; derived possibly from the Persian *jang* (war), or from Jingo, legendary empress of Japan, mother of the god of war.
Jinn, or *genii*, supernatural beings in oriental literature.
Jinnah, Mohammed Ali (born 1876), Moslem leader of India; since 1910 a powerful political leader; early proposed Hindu-Moslem unity, but later insisted India be split into separate Hindu and Moslem states; permanent president of Moslem League after 1934.
Jinrik'sha, or rickshaw, light man-drawn carriage said to have been invented in 1869 by an American Baptist missionary in Japan: *pictures* A-35, 41, T-123
Jinsen, or Chemulpo, Korea, city on w. coast, port of Seoul; scene of naval operations in Russo-Japanese War of 1904; pop. more than 100,000: *maps* J-186, A-332b
Jiplapa (*hē-pē-hā'pā*), a plant. See in *Index* Toquilla
Jin-jitsu (*jū-jit'sū*), ju-jitsu, or judo W-183, *picture* W-181
Jivaro (*hē-vā-rō*), tribe of Indians in Ecuador and n. Peru; noted for custom of preserving the heads of their enemies and chiefs after removing the bones of the skull: S-206
Joachim (*yō'ā-kīm*), Joseph (1831-1907), Hungarian (Jewish) violinist and composer; first public appearance at 7; concert master under Liszt ('Hungarian Concerto').
Joachimsthal (*yō'āk-ims-tāl*), Germany, town of n. w. Bohemia; site of rich silver mine discovered 1516. See also in *Index* Dollar
 radium from vicinity R-35
Joad, Cyril Edwin M. (born 1891), English philosopher, born London; professor, University of London, from 1930 ('Meaning of Life'; 'Guide to the Philosophy of Morals and Politics'; 'God and Evil').
Joan (*jōn*), mythical woman pope supposed to have reigned about 855-858 as John VIII; the story says she fell in love with a monk and fled with him disguised as a man, afterwards going to Rome and becoming a priest.
Joan'na (1479-1555), queen of Castile, daughter of Ferdinand and Isabella, and mother of Emperor Charles V and Emperor Ferdinand I; did not actually rule because partially insane.
Joannes (*jō-ān'ez*), or Marajo, island formed by estuaries of Amazon and Para rivers in n.e. Brazil.
Joan of Arc, Saint (1412-31) (French, Jeanne d'Arc), "The Maid of Orleans," festival May 30: J-219-20, H-358, *pictures* H-359, J-219
 Charles VII and C-150-2, *picture* C-151
 heroine of Schiller's play S-39
 memorial in Orleans O-261
 statues, *pictures* S-60, F-174
João Pessoa (*zhō-ouh' pēs-ō'ā*), Brazil, cap. of state of Parahyba on Parahyba River; pop. 100,000; sugar, cotton, manioc: *map* S-208b
Josh, or Jehoash, king of Israel, about 798-790 B.C.; expelled the Syrians from kingdom, defeated and captured Amaziah, king of Judah, and plundered the temple at Jerusalem (II Kings xlii-xiv).
Josh, or Jehoash, king of Judah, about 837-797 B.C.; slain by conspiracy of his servants (II Kings xi, xii; II Chronicles xxii-xxiv).

Job (*jōb*), long-suffering hero, Book of Job in the Old Testament J-220

Job hunting
 interview C-347d
 letters L-98d

Jobs-tears, a tall grass (*Coix lacryma-jobi*) named from hard, white oval seed cases, used in making beads; cultivated for food in some countries, and for its supposed medicinal properties in China.
Jocasta, in Greek mythology, mother and wife of Oedipus O-208

Jodhpur (*jōd-pur*), city in n.w. India; pop. 95,000; cap. of native state Jodhpur (Marwar); gave name to riding habit.

Joe, the fat boy, a character in Dickens' 'Pickwick Papers'.

Jo'el (5th century B.C.), Hebrew minor prophet, author of the Book of Joel, the 28th book of the Old Testament; he prophesied the judgments that were to come to Israel, and urged the people to repent.

Joe-Pye (*jō-pī*) weed, American perennial herb (*Eupatorium purpureum* and *E. maculatum*), with whorled leaves and end clusters of white, pink, or rose-purple flowers; often grows 12 ft. high.
Joffre (*zhōf'rī*), Joseph Jacques Césaire (1852-1931), French general and marshal of France J-220-1
 battle of the Marne M-66-7, W-154
 Verdun W-159
Jogues (*zhōj*), Isaac, Saint (1607-46), French Jesuit missionary and martyr, twice captured by Mohawk Indians, first time mutilated, 2d time killed, at Ossernenon (a Mohawk village now a part of Auriesville, N. Y.), today a place of Catholic pilgrimage; feast day March 16
 Sault Ste. Marie mission M-154
Johannesburg, Transvaal province, largest city in South Africa; center of gold fields; pop. 520,000: J-221, *map* A-42a, *picture* S-201
 route to the sea M-294
John, Saint, one of the 12 apostles, called the Evangelist; festival, Roman church, December 27, Anglican, May 6: A-229, P-141
John, the Baptist, Saint, forerunner of Jesus Christ; commemorated as saint June 24 (nativity), August 29 (beheading)
 baptizes Jesus J-214
 beheaded by Herod H-287
John, popes. See Pope, table
John XXIII (1370?-1419), pope 1410-15; called Council of Constance by which he was deposed; imprisoned in Germany.
John (1167-1216), king of England J-221-2
 Henry II and H-276
 Magna Carta M-33, D-46
 Richard I and R-104
 struggle with papacy J-222
John (1319-64), king of France, called "the Good"; enthroned 1850 at Poitiers H-358
John III, king of Poland. See in *Index* Sobieski, John
John I (1357-1433), king of Portugal, called "the Great," and "father of his country," chosen king 1385; father of Henry the Navigator
 builds Battle Abbey P-313
John II (1455-95), "the Perfect," king of Portugal; able politician and statesman; patron of Renaissance art and learning; encouraged search for sea route to India but refused help to Columbus whom he considered a visionary; reign prosperous and popular.

ü=French u, German ü; gem. ðo; (thin, then; ð=French nasal (Jenā); zh=French j (z in azure); κ=German guttural oh

John VI (1769-1826), king of Portugal; came to throne 1816 (regent from 1799); accepted Portugal constitution after insurrection (1821) and recognized independence of Brazil (1825)
exile in Brazil B-228, P-315

John, Don, of Austria (1545-78), son of the Emperor Charles V and half-brother of Philip II of Spain, victor over Turks (1571) in famous naval battle of Lepanto.

John, Augustus Edwin (born 1879), English painter of modern tendencies; born in Wales; distinguished for powerful draftsmanship and fine sense of design; painted many portraits of prominent men, including chief figures of Peace Conference; elected member of Royal Academy of Arts, 1928
modernist movement P-26

John, Epistles of, 23d, 24th, and 25th books of New Testament, attributed to Apostle John; first book, exhortations to Christian faith; second and third are short notes, one to a church, the other to Gaius, a member of church; authorship disputed.

John, Gospel of, 4th book of New Testament, attributed to Apostle John; authorship disputed; purpose to present life and works of Jesus so as to arouse faith in readers.

John Barleycorn, personification of intoxicating liquors.

'John Brown's Body', Civil War song B-250

John B. Stetson University, at De Land, Fla.; Baptist institution founded 1889; arts and sciences, law, music.

"John Bull", nickname for English nation N-143

John Carroll University, at Cleveland, Ohio; Roman Catholic institution for men, founded 1890; arts and sciences, business administration, philosophy.

John Crerar Library, Chicago, scientific library established 1894 by John Crerar, Chicago railroad magnate; famous collections include works on medicine, international law, and aeronautics.

John Doe, fictitious name of plaintiff in action in which real plaintiff's name is withheld. A "John Doe proceeding" is a process to fix liability for a known wrong committed by an as yet unknown wrongdoer.

John-dory, golden or silvery colored food fish (*Zeus faber*) about a foot long, with greatly compressed body, living in warm seas about the coast of Europe. According to legend it is the fish from which St. Peter took the tribute money, a dark spot on each side representing the imprint of his thumb and finger.

John F. Slater Fund, established in 1882 by donation of \$1,000,000 by John Fox Slater; for the education of Southern freedmen. *See also in Index* Southern Education Foundation, Inc.

'John Gilpin', poem by Cowper C-386, 387.

'John Halifax, Gentleman', novel by Miss Mulock; the hero, an orphan, reared in poverty and obscurity, rises to wealth and marries a girl of gentle birth: B-275

John Henry, mythical Negro hero of prodigious strength; worked himself to death trying to beat a machine, usually a rock drill, but, according to another version, a cotton rolling machine; legend has been traced to drilling of Big Bend

tunnel in Summers Co., W. Va., 1870-2; may be compared with Paul Bunyan.

"Johnny Applesod", nickname of John Chapman (1774-1847), American pioneer A-232

Johnny Crapaud. *See in Index* Crapaud, Jean

Johnny Inkslinger, in Paul Bunyan tales B-276

"Johnny Reb", nickname given by Federals to Confederate soldiers during Civil War.

John of Fornsete, composer of first known secular music M-310
manuscript, picture M-309

John of Gaunt (1340-99), duke of Lancaster; 4th son of Edward III of England, ancestor of House of Lancaster and through his daughters of Tudor, Stuart, and Hanover-Windsor sovereigns of England: L-59

descendants, table R-158
supports Wyclif W-191

John of Leyden (1508?-96), Dutch religious (Anabaptist) fanatic and revolutionary leader; for a year ruled "the Kingdom of Zion" in Münster; cruelly executed by prince-bishop of Münster on capture of city; central figure in Giacomo Meyerbeer's opera 'The Prophet', produced in 1849.

Johns Hopkins University, at Baltimore, Md.; opened 1876; arts and sciences, engineering, business economics, medicine, hygiene and public health; research work and publication of technical journals: B-34
Carroll Mansion, picture B-34

John Simon Guggenheim Memorial Foundation, founded in 1925 by Mr. and Mrs. Simon Guggenheim, in memory of their son, John Simon (died 1922); interest to be used for scholarships: P-162

Johnson, Andrew (1808-75), 17th president of U. S. J-222-4
administration, 1865-69
Alaska purchased J-224, A-100
Atlantic cable laid C-9

14th and 15th amendments U-210-11, 217-18

French forced to quit Mexico J-224
Impeachment J-224

Nebraska admitted N-60
reconstruction policy J-223, C-256-7

early career J-222-3
national monument, Greenville, Tenn. N-20

wife W-92
work for Union in Tennessee J-223

Johnson, Benjamin F., of Boone, pseudonym of James Whitcomb Riley R-108, picture A-179
quoted B-160, P-366

Johnson, Charles Spurgeon (born 1893), Negro sociologist, born Bristol, Va.; his writings help to explain the problems of the Negro in American society ('Ebony and Topaz'; 'Negro in American Civilization'; 'Black Man's Burden').

Johnson, Edward (born 1881), American tenor, born in Canada; sang five seasons at La Scala, Milan; member Chicago and Metropolitan Opera Companies; general manager Metropolitan Opera Assn., Inc., N. Y. City, 1935- ('Parsifal'; 'La Nave'; 'Peter Ibbetson').

Johnson, Eliza McCordle (1810-76), wife of President Johnson W-92

Johnson, Esther (1680-1728), "Stella," friend of Jonathan Swift S-342, 343

Johnson, Garret, also Gerard, or Gurratt (flourished 1616), Dutch sculptor and tomb maker who lived

in London; known also as Geraert Janssen; noted for portrait bust of Shakespeare

Shakespeare portrait, pictures S-94, 97

Johnson, Hiram Warren (born 1866), American lawyer and politician, born Sacramento, Calif.; as prosecuting attorney convicted Ruff, chief of San Francisco "boddies"; governor of California 1911-17; elected to U. S. senate 1917
candidate for vice-president R-152

Johnson, Hugh S. (1882-1942), American soldier, lawyer, born Ft. Scott, Kan.; in charge of U. S. draft, 1917-18; NRA administrator 1933-34; editorial commentator for newspaper and radio after 1934.

Johnson, Jack (born 1878), American Negro boxer, born Galveston, Tex.; world's heavyweight champion 1908-15: B-210

Johnson, James Weldon (1871-1938), Negro writer and educator, born Jacksonville, Fla.; professor Fisk University 1930-38; edited 'Book of Negro Spirituals'; wrote 'God's Trombones', poems; 'Along This Way', autobiography.

Johnson, Sir John (1742-1830), American loyalist, born near Johnstown, N. Y.; son of Sir William Johnson; kept the Six Nations on British side during Revolution.

Johnson, Josephine Whinslow (born 1910), novelist and poet, born Kirkwood, Mo.; 1934 Pulitzer prize for first novel 'Now in November'; mature and subtle in portrayal of emotion; poetic and sensitive in style ('Winter Orchard'; 'Jordans-town'; 'Year's End').

Johnson, Martin (1884-1937), American explorer, author, born Rockford, Ill.; with his wife, Osa, made motion picture records of expeditions to South Seas, Borneo, Australia, Africa; killed in plane accident; wrote, with wife, 'Cannibal Land', 'Camera Trails in Africa', 'Safari', 'Lion'.

Johnson, Mordecai W. (born 1890), Negro educator, born near Paris, Tenn.; first Negro to hold presidency of Howard University; known for his work in helping to improve living conditions among Virginia miners.

Johnson, Osa (born 1894), American explorer, writer, motion picture producer, born Chanute, Kan. In 'Over African Jungles', 'I Married Adventure', she tells of her experiences with her husband, Martin Johnson.

Johnson, Owen (born 1878), American author, born New York City; son of Robert Underwood Johnson; won popularity for his school and college stories ('The Varmint'; 'The Tennessee Shad'; 'Stover at Yale'); novels of contemporary social life ('The Salamander'; 'Sacrifice'); plays ('The Comet'; 'A Comedy for Wives').

Johnson, Pauline (1862-1918), Canadian poet, daughter of Mohawk Indian chief and English mother ('Fling and Feather', poems): C-66

Johnson, Reverdy (1796-1876), American politician and jurist, born Annapolis, Md.; U. S. senator; attorney general; minister to England; treaty he negotiated for adjustment of Alabama Claims rejected.

Johnson, Richard M. (1781-1850), American statesman and soldier, born near Louisville, Ky.; 9th vice-president of U. S.

- conquers Tecumseh T-28
vice-president, table V-392
- Johnson, Robert Underwood** (1853-1937), American editor, diplomat, and poet, born Washington, D. C.; editor *Century* 1909-13; ambassador to Italy 1920-21; active in variety of local, national, international affairs ('The Winter Hour'; 'Italian Rhapsody'; 'Remembered Yesterdays').
- Johnson, Samuel** (1709-84), famous English man of letters J-224-8, E-286, pictures J-225, C-347b
Addison praised by A-18
Burke characterized by B-278
conversational ability C-347a, J-225, picture C-347b
'Dictionary', quoted J-224, O-191
Goldsmith and G-115-16
Milton criticized by M-177-8
quoted on Shakespeare S-100c
- Johnson, Tom L.** (1854-1911), American municipal reformer and iron manufacturer, born Georgetown, Ky.; mayor of Cleveland 1901-09; strenuous advocate of single tax, public ownership of utilities; called father of 3-cent street-car fare.
- Johnson, Walter** (born 1887), conceded to be the greatest speed-ball pitcher in baseball history; elected to Baseball Hall of Fame; with Washington Senators 1907-27; holder of strike-out and shut-out records: B-56b, picture B-56a
- Johnson, Sir William** (1715-74), British colonial landowner and soldier; superintendent of Indian affairs in North America; influence with Indians of Six Nations kept them neutral in French and Indian War: N-122
introduces glove making G-107
- Johnson, William Samuel** (1727-1819), American statesman, born Stanford, Conn.; colonial agent in London for Connecticut (1767-71); his conservative attitude toward Revolutionary cause changed to able work in Constitutional Convention; president of Columbia College (now Columbia University) (1787-1800).
- Johnson City, N. Y.**, industrial suburb 2 mi. w. of Binghamton; pop. 18,089.
- Johnson City, Tenn.**, summer resort, manufacturing and lumber center 93 mi. n.e. of Knoxville; pop. 22,763; hardwood flooring, brick and tile, furniture, textiles; state teachers college: map T-46
- Johnson County War**, Wyo. C-110
- Johnson C. Smith University**, at Charlotte, N.C.; Presbyterian institution founded 1867; arts and sciences, theology.
- Johnson, Albert Sidney** (1803-62), American soldier, born Mason County, Ky.; one of ablest Confederate generals; leader in struggle for Texan independence at Shiloh S-118
- Johnston, Alexander** (1849-89), American historian, born Brooklyn, N. Y.; admitted to bar 1876; professor of jurisprudence and political economy at Princeton after 1883 ('History of American Politics'; 'American Political History, 1763-1876'; 'History of Connecticut').
- Johnston, Annie Fellows** (1863-1931), American author of stories for young people, born Evansville, Ind.; wrote 'Little Colonel' series, 'Georgina of the Rainbows'.
- Johnston, Harriet Lane** (1833-1903), niece and hostess of President Buchanan W-91
- Johnston, Sir Harry Hamilton** (1858-1927), British administrator, African explorer, zoologist, and author; originator of plan for British "Cape-to-Cairo" route; discoverer of okapi and other African animals; author of many interesting books on Africa as well as several novels; in 'The Gay-Donneys' and 'The Veneerings' he follows the career of supposed descendants of characters in Dickens' novels discovers okapi G-92
- Johnston, Joseph Eggleston** (1807-91), American soldier, born near Farmville, Va.; served in Black Hawk, Seminole, and Mexican wars with distinguished gallantry; became Confederate general 1861; commanded early operations against McClellan in Peninsular Campaign; Fabian tactics against Sherman in famous Georgia campaign won his opponent's praise as "the equal in all the elements of generalship to Lee"; elected to U. S. Congress in 1876 opposes Sherman S-116 surrenders C-256
- Johnston, Mary** (1870-1936), American novelist, born Buchanan, Va.; author of popular historical romances ('Prisoners of Hope'; 'To Have and to Hold'; 'Sir Mortimer').
- Johnston Sarah Bush**, 2d wife of Thomas Lincoln L-140
- Johnston Falls**, rapids on the Luapula River in s. cent. Africa on s.e. boundary of Congo State: map C-331
- Johnston Island**, U. S. naval base in the Pacific about 700 mi. s. w. of Honolulu; taken over by U. S. in 1918: N-52, map N-52
- Johnstown, N. Y.**, manufacturing city of historic interest, 40 mi. n.w. of Albany; pop. 10,666; silk, lumber, gloves, knit goods, leather, gelatin; named for Sir William Johnson whose mansion, built in 1761, still stands: map N-114
glove industry founded G-107
- Johnstown, Pa.**, iron and steel manufacturing city 60 mi. e. of Pittsburgh on Conemaugh River in soft-coal district; pop. 66,068; chemicals, textiles, lumber; flood of 1889 took more than 2000 lives: map P-112
- Johore (jō-hōr')**, unfederated state in Malay Peninsula; 7330 sq. mi.; pop. 600,000, many Chinese: M-43
- Joint**, in skeleton S-166
- Joint Commission**, International. See International Joint Commission
- Joint Four-Nation Declaration** (Moscow Pact), 2d World War W-179g-h, R-146r
- Joint snake**, or glass snake, a legless lizard: L-171
- Joint stock company**
American colonies founded by A-151-2
modern corporation S-290
origin C-322
- Joint tenants**, in law, holders of property, whose rights to the property are equal and mutual; one right is always the right of survivorship, by which, at the death of one tenant, the surviving tenant or tenants acquire all the rights of the deceased tenant by operation of law.
- Jojo River (hō'hō)**, in the lower end of Cuba, e. of Santiago; about 35 mi. long.
- Jókai (yō'koi)**, Maurus (1825-1904), Hungarian novelist ("the Magyar Dumas") and revolutionist of 1848; brilliant, prolific but uneven genius ('Tamar's Two Worlds').
- Jol**, or Yule, winter month in northern Europe C-226
- Jollet (zhō-lō-yā')**, Louis (1645-1700), French-Canadian explorer J-226, C-192
Marquette and M-67
- Joliet (jō'yēt)**, Ill., industrial and railroad city 85 mi. s.w. of Chicago; pop. 42,865; iron and steel products, wall paper; limestone near by; state penitentiary and penal farm; College of St. Francis (women): map I-13
- Joliette (zhō-lō-ēt')**, Quebec, Canada, town on L'Assomption River about 35 mi. n. of Montreal; pop. 10,785; tobacco and biscuit factories, foundries, saw, paper, grist, and woolen mills; lime and stone: map, inset C-50c
- Joliot, Frederic** (born 1900), French physicist and chemist; professor at Radium Institute in Paris; Nobel prize in chemistry (1935) awarded to him and his wife, Irene Joliot-Curie: R-34
- Joliot-Curie (zhō'yē-ē-kū-rē')**, Irene (Mme. Frederic Joliot) (born 1897), French physicist, daughter of Marie Curie; undersecretary of scientific research in French cabinet 1936; awarded 1935 Nobel prize in chemistry: R-34
- Jolly (yō-lō')**, Philipp von (1809-84), German physicist; inventions include Jolly spring balance for determining specific gravity.
- "Jolly Roger," pirate's flag P-222
- Jolo (hō-lō')** Island, chief island of Sulu Archipelago, P. I.
- Jolson, Al** (Asa Yoelson) (born 1886), American actor and singer; starred in 'The Jazz Singer' (1927), first sound film with both music and dialogue.
- Joly, John** (1857-1934), Irish physicist and geologist, born King's County, Ireland; professor of geology and mineralogy in University of Dublin (Trinity College) 1897-1934; invented diffusion photometer and made valuable experiments in color photography; devised melometer to determine melting point of minerals; saw importance of radioactivity in earth history ('Radioactivity and the Surface History of the Earth') estimates earth's age E-130
- Jommelli (yōm-mē'lē)**, Nicola (1714-74), Italian composer, born near Naples; welded together German and Italian characteristics; composed operas and church music ('Miserere').
- Jo'nah**, Hebrew minor prophet (8th century? b.c.); as told in Book of Jonah, disobedient to divine summons, draws storm on ship in which he tries to escape; is thrown into sea and swallowed by a great fish; is saved by Jehovah; delivers divine message to Nineveh but resents city's preservation until taught compassion by the lesson of the gourd.
- Jon'athan**, son of Saul and beloved friend of David (1 Samuel xx, II Samuel i, 19-27) D-19
- "Jonathan, Brother," popular personification of U. S. N-143
- Jones, Henry Arthur** (1851-1929), English dramatist; born on farm; provided for self from age of 13; especially successful in social plays ('Saints and Sinners'; 'Mrs. Dane's Defense'; 'Michael and His Lost Angel'; 'The Hypocrites'; 'The Lie'; 'Cock o' the Walk').
- Jones, Inigo** (1573-1652), famous

ü=French u, German ü; jem, go; thin, then; ñ=French nasal (Jeañ); sh=French j (s in azure); x=German guttural ch

- English architect, born London; called the "English Palladio"; studied landscape painting and architecture in Italy; employed Renaissance principles to create a new style of building in England; designed stage settings and properties for Ben Jonson's masques.
- Jones, Jacob** (1768-1850), naval officer, born near Smyrna, Del.; commander of sloop-of-war *Wasp*. See in *Index* 'Trolie' and the 'Wasp', battle of
- Jones, Jesse Holman** (born 1874), public official, born Robertson Co., Tenn.; publisher *Houston Chronicle*; chairman Reconstruction Finance Corporation 1933-39; administrator Federal Loan Agency 1939; member National Emergency Council 1933-39; appointed secretary of commerce 1940.
- Jones, John Paul** (1747-92), American naval hero J-226-7 first navy flag (Cambridge) F-98, color plate R-90 mission to France J-226 taking the 'Serapis', picture R-90
- Jones, Marvln**, lawyer, born Cooke Co., Texas; U. S. Congressman 1917-40; appointed judge of U. S. Court of Appeals 1940; made War Food Administrator 1943.
- Jones, Mary** (Mother Jones) (1830-1930), labor leader, born Cork, Ireland; came to America 1861; for 60 years worked to better conditions for workers; prominent in Haymarket riot, Chicago, 1886.
- Jones, Robert Edmond** (born 1887), theatrical designer, born Milton, N.H.; bold, original treatment; designs for 'Hamlet'; 'Desire Under the Elms'; 'Green Pastures'.
- Jones, Sir William** (1746-94), English orientalist and linguist; pioneer in study of Sanskrit.
- Jones Aot** (Philippines) P-170
- Jonesboro, Ark.**, city in n.e. 62 mi. n.w. of Memphis, Tenn.; pop. 11,729; wood products, baskets; railroad shops; Arkansas State College: map A-296
- Jonesboro, Ga.**, town 18 mi. s. of Atlanta; pop. 1204; Federal victory under Howard, Aug. 1864, resulted in fall of Atlanta.
- 'Jongleur de Notre Dame, Le'** (*lû zhôn-glûr dû nôtrû dâm*), opera by Massenet, story O-230
- Jongleurs**, French name given, in Middle Ages, to strolling entertainers; were jugglers, acrobats, dancers, often singing and playing compositions of troubadours, who were of higher class.
- Jon'quill**, a type of narcissus N-11
- Jonson, Ben** (1573?-1637), English dramatist J-227 bust in Westminster Abbey W-73 court poet P-266 quoted on Shakespeare S-96, 1000 Shakespeare and S-96
- Jooss** (*yôss*), Kurt (born 1901), dancer, head of Jooss Ballet; born Württemberg, Germany; founded school in Essen 1927, removed to England 1934; famous ballets: 'Green Table'; 'Big City'; 'Ball in Old Vienna'.
- Jop'lin, Mo.**, industrial city in s.w. near Kan. border and 10 mi. from Okla.; pop. 37,144; in one of richest zinc and lead regions in the world; explosives, lumber, packed meats: map M-208
- Joppa** (*jôpâ*), Palestine. See in *Index* Jaffa
- Jordons** (*yôr'dâns*), Jacob (1593-1678), Flemish historical, genre, and portrait painter, born Antwerp; works characteristic of Flemish school; full, robust figures, broad humor, warm colors.
- Jordan, David Starr** (1851-1931), American biologist, educator and author; born in Gainsville, N.Y.; president of Indiana University; later of Stanford University; leading authority on fishes, and prominent in world peace movement ('Evolution and Animal Life'; 'Fishes of North and Middle America'; 'War and Waste'; 'Days of a Man').
- Jordan River**, sacred river of Palestine; rises in n., flows 200 mi. s. in deep valley through lakes Merom (Huleh) and Galilee into Dead Sea: P-33-4
- Jordan River, Utah**, flows from n. end of Utah Lake into Great Salt Lake.
- Joseffy** (*yô-sêf'f*), Rafael (1852-1915), American pianist and composer, born Hungary; after 1880 lived in N.Y. and was famous as teacher and concert virtuoso; author of 'School of Advanced Piano Playing'.
- Jo'seph, Saint**, husband of Mary the mother of Jesus; festival March 19: J-213
- Joseph I** (1678-1711), Holy Roman emperor, succeeded to throne 1705; vigorously prosecuted wars against France and Hungary, and forced pope to acknowledge his brother Charles as king of Spain; a liberal ruler, especially in religion and in matters relating to the peasantry.
- Joseph II** (1741-90), Holy Roman emperor, son of Maria Theresa; benevolent despot; upset old customs and provoked discontent and revolt; died disillusioned and broken-hearted: M-63
- Joseph, Hebrew patriarch**, son of Jacob and Rachel; father of Ephraim and Manasseh (Gen. xxxvii) J-227, J-216
- Joseph, of Arimathea**, rich Israelite, who contended the body of Jesus in his own sepulchre; commemorated as saint March 17 brings Holy Grail to Britain G-1 Sir Galahad and, picture A-316
- Joseph, Chief** (1840?-1904), American Indian chief and leader of Nez Percé Indians, born probably in Wallowa Valley, Ore.; became chief 1873; refused to recognize treaty of 1863 with U.S. government by which his people were deprived of their tribal lands; 1876-77 outwitted U.S. Army detachments in brilliant campaign until greatly superior forces compelled his surrender; spent rest of life on Colville reservation, Washington.
- 'Joseph Andrews'**, novel by Fielding N-182
- Josephine** (1763-1814), empress of the French J-227-8, picture J-228
- Josephs-coat**, an annual plant (*Amaranthus tricolor*) of the amaranth family, native to tropical regions. Leaves thin, oval, pointed. Each leaf has several colors in it, giving a patched appearance.
- Josephus, Flavius** (37?-95? A.D.), Jewish historian ('The Jewish War', 170 B.C.-70 A.D.; 'The Jewish Antiquities', from earliest time to reign of Nero) H-267
- Josh'ua**, leader of Israelites, successor to Moses J-216
- Joshua**, sixth book of Old Testament, named for Joshua; account of Jewish settlement in Canaan.
- Joshua tree**, or tree yucca (*Yucca brevifolia*), a species of yucca native to w. and s.w. U.S.; also called Joshua yucca and yucca palm; clusters of stiff spikelike leaves: N-22a, picture P-235
- Joshua Tree National Monument**, in California N-22a
- Josiah** (7th century B.C.), king of Judah; abolished idolatry and re-established worship of the Lord (II Kings xxii-xxiii): J-216
- Jostedalsbræ** (*yôss-tê-dills-brê*), Norway; largest European ice-field; lies between Sogne Fjord and Nord Fjord; 580 sq. mi. in area.
- Jotunheim** (*yô'tyn-hîm*), mountainous region of s. Norway N-174
- Jotunholm**, in Norse mythology, home of frost giants O-202 Thor's visit to T-82-4
- Joubert** (*zhô-bêr'*), Joseph (1754-1824), French philosopher and writer; famed for brilliance of his conversation and correspondence.
- Joubert, Petrus Jacobus** (1834-1900), Boer general, commandant general in 1st and 2d Boer wars; repelled James Ralid.
- Jouffroy D'Abbans** (*zhô-frwâ dô-bânss*), Claude François Dorotheé, Marquis de (1751-1832), French inventor; pioneer in steam navigation; forerunner of Fulton.
- Joule** (*joul*), James Prescott (1818-89), English physicist; formulated law of conservation of energy discovery ridiculed F-6 measurement of heat H-260
- Joule**, unit of work, named for James Prescott Joule P-166
- Jourdain** (*zhôr-dân*), M., hero of Molière's 'Le Bourgeois gentilhomme' (The Tradesman Turned Gentleman).
- Journalism**, as a career N-108. See also in *Index* Newspapers
- Dickens' experience** D-67a
- Kipling in India** K-24
- 'Journal to Stella'**, by Swift S-348, 844
- Journeyman**, in apprentice system of training V-313
- medieval guilds** G-88, E-172
- Joust** (*jûst*), or Just, knightly combat in which armored contestants engaged each other singly; combat between troops of knights usually called a *mêlée* (*mâ-lâ'*): K-30-1
- Jouvenel** (*zhôv-nêl'*), Henri de (1876-1935), French politician and writer; editor *Le Matin*, 1905-24; delegate League of Nations 1922 and 1924; minister public instruction, 1924; high commissioner Syria, 1925; first wife was Mme. Colette, the French novelist; wrote 'The Stormy Life of Mirabeau'.
- Jovanovic** (*yô-vô'nô-vich*), Jovan (1833-1904), Serbian poet and journalist; pen name Zmaj (the dragon) from one of two humorous periodicals he founded; educated in law and medicine; best known for lyrics and humorous poems ('Saran', a play; 'Faded Roses', verse).
- Jove** (*yôv*), or Jupiter, chief deity of the ancient Romans, identified with Greek Zeus Z-216-7, J-229. See also in *Index* Zeus
- "Jove's flower,"** the clove pink P-221
- Jowett, Benjamin** (1817-93), English scholar, theologian, and teacher; master of Balliol College, Oxford; great influence on English life through eminent pupils quoted on Plato P-247 Swinburne and S-346
- Joyce, James** (1882-1941), Irish poet and novelist, born Dublin; lived in Trieste, Zurich, Rome, Paris;

Key—câpe, ât, fâr, fâst, what, fâll; mē, yēt, fērn, thêre; îce, bîr: rôw, wôn, fôr, nôt, dâ; câre, bût, ryde, fûll, bûrn:

started with book of charming verse ('Chamber Music'); then wrote sketches of Dublin life ('Dubliners') and autobiographical novel ('Portrait of the Artist as a Young Man'), which has been called greatest classical novel of our times; later took to a form of realism so highly flavored that his first book in this style ('Ulysses') was suppressed; invented for his own purposes a vocabulary of telescoped words drawing on 14 languages ('Finnegans Wake', long known as 'Work in Progress')

place in English literature E-288

Juan (*huán*), or Giovanni, Don. See in Index Don Juan

Juana Inés de la Cruz (1651-95), Mexican nun and poet L-67h, w

Juan de Fuca (*huán' dā fū'kū*), Pacific Ocean strait between Vancouver Island, Canada, and Washington, U. S.: maps W-29, C-50b

Juan Fernández (*hū-wān' fēr-nān-dās*), group of three small islands in South Pacific—Más a Tierra, the largest, Más a Fuera, and Santa Clara; discovered by Juan Fernandez in 1574; name formerly applied only to Más a Tierra: C-207d

Alexander Selkirk and story of 'Robinson Crusoe' C-407-8

Juan Manuel (*mān-g-āl'*), Don (1282-1347), Spanish statesman and writer; noble of royal family; engaged in wars, politics, and revolutions; many of literary works expository; most famous for his 'El Conde Lucanor', a collection of 50 stories, predecessor of Boccaccio's 'Decameron'.

Juárez (*huá-rās*), Benito Pablo (1806-72), Mexican statesman, sometimes called the "Mexican Washington"; his reign as president noted for liberal reforms: M-142d

Juárez, or Ciudad (*sē-yū-dād'*) Juárez, Mexico, city on Rio Grande opposite El Paso, Tex.; international bridges connect the two cities; center of stock-raising and agricultural region; pop. 40,000: map M-133

mission E-257

Ju'bal, son of Lamech and Adah; father of musicians (Gen. IV, xxl).

Juba River, Africa, rises in Ethiopia and flows s.e. to Indian Ocean.

Jubbulpore (*jūb-ūl-pūr'*), or Jabalpur, an important manufacturing and trading city in cent. India, 550 mi. w. of Calcutta; pop. 125,000; cap. of Jubbulpore district; makes cotton goods, wire netting, statuary; once home of Thugs, society of religious assassins: map A-332c

Jubilee, in Jewish history, every 50th year from entrance of Hebrews into Canaan to be set aside for rejoicing, Israelite slaves to be freed, alienated ancestral possessions to be restored, no sowing or reaping of land; term now applied to 50th anniversary of any event, or to a season of rejoicing.

Jucar (*hū'kūr*) River, in e. Spain; 270 mi. to the Mediterranean: map S-226

Judah (*jū'dā*), Hebrew patriarch, 4th son of Jacob and Leah, traditional ancestor of tribe of Judah.

Judah, s. kingdom of Palestine; remained faithful to house of David after break in kingdom of the Jews; cap. Jerusalem: J-210-17

Ju'daism, the religion of the Jews R-72, J-127, B-102, 104. See also in Index Jews

Ju'das (Thaddeus), or Jude, Saint, one of the 12 apostles; said to have been martyred; festival October 28: A-229

Judas Iscar'iot, disciple who betrayed Jesus for 30 pieces of silver (Matt. xxvi, 14-16, 25, 47-50) A-229, J-214

Judas Maccabae'us. See in Index Maccabees

Judas tree. See in Index Red-bud

Judd, Charles Hubbard (born 1873), American psychologist, born British India; professor at Yale and University of Chicago; made many surveys of schools; author of many works on psychology and education.

Jude, Saint. See in Index Judas (Thaddeus)

Jude, Epistle of, twenty-sixth book of New Testament; doubtful authorship, often attributed to Judas Thaddeus (St. Jude); exhortation to constancy in Christian faith.

Juden (*jū-dē'ā*), or Judaea, a Greco-Roman name for s. Palestine; in time of Christ part of province of Syria and also kingdom of the Herods; in Roman times southernmost division of Palestine: J-217

Judge, in law C-335, J-230, 231

Judge Advocate General, in U.S. Army, has charge of legal matters, including supervision of courts martial; in U.S. Navy, has charge of matters of law arising in Navy Department insignia, picture U-178

Judges, leaders of Israelites J-216

Judges, Book of, seventh book of the Old Testament; describes history of Israelites under the rule of the Judges.

Judges' Cave, New Haven, Conn. N-88

Judgment character development, Outline C-143

reading and study require S-309-10, R-58

Judgment, in law, the declaration, by a court of competent jurisdiction, of the rights and duties of the parties to a lawsuit which has been submitted to it for decision.

Jud'iciary. See in Index Courts of Justice

Ju'dith, Jewish heroine, captivated Assyrian general Holofernes and slew him while he slept, thereby delivering the besieged Israelites; story told in book of Judith in the Apocrypha.

Judo, Ju-jitsu, or Ju-jutsu W-183, J-189, picture W-181

Judson, Adeniram (1788-1850), American missionary to India; probably greatest and first American foreign missionary; translated Bible into Burmese: B-279

Judson, Harry Pratt (1849-1927), American educator, born Jamestown, N.Y.; educated Williams College; teacher and principal high school, Troy, N.Y.; professor history University of Minnesota; at University of Chicago after 1892, first as professor political science; as president 1907-23; writer on political science and history.

Jug'ernaut. See in Index Jagannath

'Juggler of Notre Dame, The', opera by Massenet, story O-230

Juglandaceae (*gū-glān-dā'sē-ē*). See in Index Walnut family

Jugoslavia. See in Index Yugoslavia

Jugular vein, a large vein in the neck P-207

Jugurtha (died 104 B.C.), usurping king of Numidia; defied Roman power for several years, defeating

and bribing opposing generals; captured by Marius.

Julliard (*jū'lē-ārd*), Augustus D. (1840-1919), American capitalist, born Canton, Ohio; head of dry goods commission house, New York; prominent in banking and insurance world; at his death left \$12,000,000 to establish Julliard Musical Foundation to help worthy students obtain musical training, to instruct and encourage general American public in musical interests.

Julliard Musical Foundation P-162

'Julve, La' (*lā zhū-ēv'*) ('The Jew-ess'), opera by Halévy, story O-230

Juiz de Fora (*zhū-ēsh' dā fō'rā*), Brazil, manufacturing city on Parahyba River about 90 mi. n. of Rio de Janeiro; pop. over 100,000; knitted goods; lumber, coffee, sugar, cotton: map B-226

Jujube (*jū'jūb*), a genus (*Zizyphus*) of shrubs and trees grown for foliage and small, brown, fleshy, oval fruits; used in candy or as preserved fruit. Believed to have originated in Syria, carried by Romans to Europe, now found in all tropical regions. Common, or Chinese, jujube, grows to 40 ft. Leaves oval, with 2 spines at base; flowers small, green or white, in clusters.

Ju-jutsu (*jū-jut'sū*), Ju-jitsu, or Judo, W-183, picture W-181

Jukes, fictitious name of a family of New York State investigated by R. L. Dugdale and famous for large percentage of pauperism and criminality; records of 709 of 1200 members show 280 paupers, 140 criminals, and large proportion of moral and physical degenerates.

Jul, Christmas in northern lands C-229a

Julia (83?-54 B.C.), wife of Pompey P-302

Jullaca (*jū-lē-ā'kā*), village in Peru, picture P-138

Julian (Flavius Claudius Julianus) (331-363 A.D.), Roman emperor, called "the Apostate"; nephew of Constantine the Great; brought up as Christian, became philosophic pagan; proclaimed emperor by army 361 A.D.; able ruler and last pagan emperor.

Juliana, Princess (born 1909), heir to throne of the Netherlands; exile in Canada after German invasion of the Netherlands in 1940: N-73

Juliana canal, in the Netherlands, table C-433

Julian calendar C-22

Ju'liet, heroine of Shakespeare's tragedy 'Romeo and Juliet' R-146

Juliette Low (16) Memorial Fund G-94

Julius I, Saint (died 352), pope J-228

Julius II (1443-1513), pope J-228

Bologna made Papal State B-170

Michelangelo and M-148

Julius III (1487-1555), pope J-228

'Julius Caesar', tragedy by Shakespeare, written about 1599; relates story of death of great conqueror, portraying character of Brutus and of Mark Antony; ends with Brutus' death

chronology and rank S-100e

Julius Rosenwald Fund, founded 1917 in Chicago, for (1) improving rural education, especially in the South; (2) developing leadership among Negroes and white Southerners through fellowships; (3) facilitating advanced education and health among Negroes. See also in Index Rosenwald, Julius

July, 7th month of year J-228
birthdays of famous persons. *See in Index* Anniversaries and birth-
days, *table*
birthday stone G-25
holidays: United States H-321;
foreign H-322

July Fourteenth, national independ-
ence festival of France, celebrating
fall of Bastille F-202

"July Revolution." *See in Index* Rev-
olution of 1830 (France)

Jum'bo, noted circus elephant E-250,
C-237c

Jum'na River, tributary of the Ganges
River, n. India; rises in Himalayas,
flows 860 mi. s. and s.e. to Ganges
River: C-5
Delhi D-43

Jumping bean, triangular seeds of
any of several Latin American
swamp trees of the spurge family,
containing the full-grown larva of
a small gray moth. When a seed
pod falls to ground the larva jumps
and rolls, taking the "bean" with it.
Also called Mexican jumping bean
and broncho bean.

Jumping mouse, a North American
mouse with very long hind legs;
able to leap from 9 to 15 ft.
hibernation H-289
name applied to jerboa R-51, K-1,
picture A-33

Jumping spider, small spider of the
family *Attidae*
courtship S-257

Juncaceae (*jung-ká'sé-é*), the rush
family, a large family of grasslike
plants.

Junco (*jung'kó*), a plump slate-col-
ored type of finch F-35

June, 6th month of year J-228
birthdays of famous persons. *See in*
Index Anniversaries and birth-
days, *table*
birthday stone G-25
holidays: United States H-321; for-
eign H-322

Juneau (*shú-nó*'), Laurent Solomon
(1799-1856), American pioneer,
born near Montreal, Canada,
settles at Milwaukee M-181

Juneau (*jy'nó*), Alaska, capital and
largest city; on inlet of Pacific 100
mi. n. of Sitka; pop. 5729; com-
merce in gold, furs, salmon: *map*
A-105, *picture* A-106

Juneberry. *See in Index* Shad bush

June bug, May beetle, or cockchafer,
a beetle J-228

Jung (*yung*), Carl (born 1875),
Swiss analytical psychologist; first
a disciple of Freud, then developed
a modified system of his own; di-
vided man into introvert and ex-
trovert types.

Jungfrau (*yung'frou*) ("maiden"),
Alpine peak (13,670 ft.) S-349, *pic-
ture* S-350

Jungle (from Sanskrit word meaning
waste land), uncultivated land cov-
ered with trees and other thickly
growing and tangled plant life
Africa A-36; products A-42
Asia A-330
Borneo B-197
Central America C-132, P-41, *pic-
tures* C-133, 133a
Congo C-330
India I-34
Java J-203
Malay Peninsula M-41-2
New Guinea N-83
Orinoco delta O-250
Samoa S-20
South America A-139, B-226a-b,
pictures B-226b, c

Jungle Books, two collections of ani-
mal stories by Kipling: "The Jungle

Book' and 'The Second Jungle Book'
origin L-183, K-24, 24a

Jungle fowl P-336

Juníata College, at Huntingdon, Pa.;
founded 1876 by Church of the
Brethren; arts and sciences.

Junior, in colleges C-301

Junior Audubon clubs A-363

Junior college C-301

Junior high school E-185

Junior Leagues of America, The Asso-
ciation of, an organization to pro-
mote social welfare; made up
(since 1921) of individual Junior
Leagues, the first of which had been
founded in 1900; branches in cities
of U. S. and Canada, with main
office in New York City.

Junior lien bonds S-291

Junior Red Cross R-60, N-12m

Junior Republic G-54

Ju'niper, various conifer trees or
shrubs with dark-blue berry-like
cones J-228-9
thrives in swamps W-49

Junípero Serra (*hó-né-pá-ró sè'rú*),
Miguel José (1713-84), Franciscan
missionary to California Indians,
founder of chain of 10 Spanish mis-
sions; converted more than 3000
Indians; born Majorca: C-32
statue, *picture* C-34

Ju'níus, pen name of author of a
famous series of scorching English
political letters attacking George
III and his ministers 1769-72; real
authorship never proved, attributed
to more than 40 persons, but gen-
erally conceded to Sir Philip Fran-
cís.

Junk, Chinese boat C-218, *pictures*
C-221d, S-125

Junkers (*yung'kérz*), in Germany
B-147

Ju'no, in Roman mythology, goddess
identified with Greek Hera, some-
times called Moneta J-229, H-281,
picture M-326. *See also* Hera

June named for J-228

Junco, an asteroid A-339

Juno's bird, the peacock P-94

Junta, term (from Latin word mean-
ing "join") used in Spanish and
Spanish-American countries for
groups meeting for political or ad-
ministrative purposes. "Junta" and
"junta" also used for united politi-
cal factions, particularly that of
Whigs in control of government in
England at time of William III.

Junto, The, discussion club formed
by Benjamin Franklin in Philadel-
phia in 1727; later developed into
American Philosophical Society.

Ju'piter, or Jove, in Roman mythol-
ogy, chief deity, identified with
Greek Zeus J-229, Z-216-7. *See*
also in Index Zeus

Jupiter, a planet P-230, 232, *diagrams*
P-230, 231, 233, *table* P-231
origin of name J-229
satellites P-232; Galileo's discovery
G-1

Jura (*jy'rá*) ("deer island"), 4th
largest of Inner Hebrides, Scot-
land; 160 sq. mi.; H-267

Jura Mountains, on border of France
and Switzerland J-229, *map* S-351

Juras'ic period, in geology G-40, 42,
pictures G-41, F-162

Jurisdiction, in international law
I-108-9

Jurispru'dence, science of the develop-
ment and nature of law and the
study and classification of laws:
See also in Index Law

Jurua (*elk-rq-d'*) River, tributary of
the Amazon in Brazil; 1200 mi.

from source in Peru: *maps* B-228,
S-208b

Jury J-229-31
ancient Greece G-160: Solon's law
S-193
coroner's J-230
England establishes H-275-8
grand J-230: Henry II establishes
H-275
petty or petit J-229-30
trial required U-215, U-217

Jus sanguinis (*jús sáng-gwín'is*)
(right of descent), basis of citi-
zenship C-238

Jusserand (*zhús-ráh'*), Jean Jules
(1855-1932), French diplomat and
scholar, ambassador to U.S. 1902-
24; author of several works on
English literature and life, notably
'Piers Plowman' and a 'Literary
History of the English People'.

Jussieu (*zhús-yú*'), Antoine Laurent
de (1748-1836), French botanist;
his 'Genera plantarum' formed ba-
sis of modern plant classification;
three uncles and a son were also
distinguished botanists.

Jus soli (*jús só'li*) (right of the
soil), basis of citizenship C-238

Just, Ernest Everett (1883-1941),
Negro biologist, born Charleston,
S. C.; noted for his studies of egg
cells and fertilization.

Just. *See in Index* Joust

Justice, of the Supreme Court C-385

Justice, courts of C-385-8. *See also in*
Index Courts of Justice

Justice, Department of, a department
of the federal government of the
United States U-223, *chart* U-229
Immigration and Naturalization
Service U-223, I-22-4, N-27

Justice of the peace, minor official in
England and the United States,
appointed or elected to keep order
in territory to which he is as-
signed; has power in specific civil
matters and in petty criminal
cases.

Justin I (450-527), Byzantine em-
peror; an ignorant peasant, he rose
to rank through army
uncle of Justinian I J-232

Justinian I (483?-565), Byzantine
emperor J-231-2, B-290
plague B-153

Santa Sophia built by, *picture* A-261

silk culture introduced S-145

Vandals conquered V-272

Justinian code of law J-231
money-lending B-43

Justin Martyr, Saint (100-185?),
Church Father; adherent of Pla-
tonic system; one of foremost
Christian apologists; born in Pal-
estine of pagan parents; said to
have been beheaded at Rome.

Justo (*hó'stó*), Augustin' (1876-1948),
president of Argentina (1932-38)
A-281

Jute J-232
cellulose source, *chart* C-123
compared with other fibers J-232
used to insulate cables C-4

Jutes, a Teutonic people related to
the Angles and Saxons, generally
believed to have come from Jut-
land
invade Britain D-53, E-270
related to Scandinavians S-36

Jutland, low flat peninsula of n. Eu-
rope forming largest part of Den-
mark D-50-2, *map* D-53
runic stones, *picture* N-166

Jutland, battle of (1916) W-158
Beatty at B-70

Ju'venal (80?-140), or Decimus Ju-
venalis, Roman poet and
satirist L-69

Juvenilo courts J-232